

## FLORAE MALESIANAE PRECURSORES XXVII SUPPLEMENTARY NOTES ON MALAYSIAN ERICACEAE (GAULTHERIA, COSTERA, DIPLYCOSIA)

by

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### 1. Remarks on and new records of the genus *Gaultheria* L. in Malaysia

*G. abbreviata* J. J. S. in Fedde, Rep. 35, 1934, 292; Sleum., Reinwardtia 4, 1957, 172.

SUMATRA. Tapanuli, Tele, S. of Sidikalang, *Alston* 14878. Westcoast, G. Singgalang, 1900 m, *Meijer* 5919.

*G. acroleia* Sleum., Reinwardtia 4, 1957, 169.

SUMATRA. Atjeh, G. Losir, *Van Steenis* 8592 (BO), 8646 (BO).

*G. kemiriensis* Sleum., Reinwardtia 4, 1957, 171.

SUMATRA. Atjeh, Gaju Alas Lands, near Pang-mog, 2200 m, *Fairchild* 120 (BO).

*G. leucocarpa* Bl.

f. *cumingiana* (Vid.) Sleum., Reinwardtia 4, 1957, 179.

In my above-cited revision of the genus *Gaultheria* in Malaysia I have listed all Sumatran material of *G. leucocarpa* with glabrous inflorescences and no fruits, or with the colour of fruits not indicated, under f. *leucocarpa*, i. e. the form with white fruits known from Java. At the same time, however, I stated that part of these gatherings possibly belongs to f. *cumingiana*, which has blue-blackish fruits. Of the specimens cited *Lörzing* 6629, according to the original label I have seen but recently from the Bogor Herbarium, has dark fruits. De Voogd (Trop. Natuur 23, 1934, 82) says, that he never came across the form with white fruits in Southern Sumatra.

The only specimens of *G. leucocarpa* Bl. with white fruits known to me from Sumatra up to now are:

f. *leucocarpa*; Sleum., Reinwardtia 4, 1957, 178.

SUMATRA. Tapanuli, between Sidikalang and Pongkolan, 1200 m, *Alston* 14800 (BM), with white fruits, 27-3-1954.

f. *scandens* Hochr., *Candollea* 2, 1925, 494; Sleum., *Reinwardtia* 4, 1957, 180.

SUMATRA. Atjeh, G. Peëut Sago, 2300 m, *Gall* 87 (BO, L), fr. white tinged pink, 22-6-1939.

*G. mundula* F. v. M., Trans. R. Soc. Vict. n.s. 1 (2), 1889, 21; Sleum., *Reinwardtia* 4, 1957, 173.

var. *mundula*.

NEW GUINEA. Western Highlands, Mt Hagen, 3350 m, *Robbins* 1045. Eastern Highlands, Mt Wilhelm, 3500—3560 m, *N. G. F.* 260 *Keogh*; *N. G. F.* 8921, 8937 *Womersley*; *Brass* 29801. Mt Michael, 3500—3560 m, *N. G. F.* 5983, 5987 *McGrath*; *Brass & Collins* 31278; *ibid.*, c. 3300 m, *N. G. F.* 11483 *Womersley*.

var. *tanythrix* (Sleum.) Sleum., stat. nov. — *G. tanythrix* Sleum., Bot. Jahrb. 72, 1942, 214; *Reinwardtia* 4, 1957, 173.

NEW GUINEA. Eastern Highlands, near Kerigomna-camp, Goroka subdistr., 3000 m, *Hoogland & Pullen* 5542; Mt Wilhelm, near Lake Piunde, 3700 m, *Hoogland & Pullen* 5751.

Recently collected material of *G. mundula* in the Central Highlands shows such a variability in leaf shape and in the colour of the fruits — characters on which *G. tanythrix* was based as a separate species — that it seems more correct to consider *G. tanythrix* a mere variety of *G. mundula*. Correspondingly *G. tanythrix* var. *setifolia* is transferred to *G. mundula* as follows:

var. *setifolia* (Sleum.) Sleum., comb. nov. — *G. tanythrix* Sleum. var. *setifolia* Sleum., Bot. Jahrb. 72, 1942, 215; *Reinwardtia* 4, 1957, 173.

*G. novaguineensis* J. J. S., Med. Rijksherb. 25, 1915, 5; Sleum., *Reinwardtia* 4, 1957, 183.

var. *novaguineensis*.

NEW GUINEA. Central part, Star Mts, Mt Antares, 3200 m, *Kalkman* 4543.

var. *pascua* Sleum., *Reinwardtia* 4, 1957, 183.

NEW GUINEA. Southwestern part, Mt Carstensz, 'Dajakweide', 4000 m, *Dozy* s.n.

*G. nummularioides* D. Don, Prodr. Fl. Nepal. 1825, 150; Sleum., *Reinwardtia* 4, 1957, 172.

SUMATRA. Atjeh, G. Losir, *Van Steenis* 8595, 8610. Bur ni Telong, *Frey-Wyssling* 26; *Van Steenis* 6334. Eastcoast, Sibolangit, *Lörzing* 6130.

JAVA. West Java, G. Papandayan, 2400 m, *Backer* 5522; *Van Steenis* 4085. G. Gedeh, *Backer* 3300, 31279; *Van Steenis* 1997, 10607. Ked u, G. Sumbing, 2100—3200 m, *Docters van Leeuwen* 8755; *Loogen* s.n.; *Lörzing* s.n. G. Sindoro, 3100 m, *Docters van Leeuwen* 8896. Dieng, 2200 m, *Brinkman* 263. Malang, G. Smeru, 2600 m, *Backer* 3728. G. Hijang, 2600—2800 m, *Backer* 9830. Besuki, Idjen, *Van Steenis* 12111.

BALI. G. Ajung, *Van Steenis* 7907.

*G. pullei* J. J. S., Med. Rijksherb. 25, 1915, 7; Sleum., *Reinwardtia* 4, 1957, 177.

var. *pullei*.

NEW GUINEA. Eastern Highlands, Mt Michael, 3350 m, *Brass & Collins* 31269; near Kelsugl, 2135 m, *N. G. F.* 8976 *Womersley*; Kerigomna, Goroka subdistr.,



3250 m, *Hoogland & Pullen 5561*. Morobe Distr., Kaindi (Wau), 2060 m, *Brass 29531*.

**G. viridiflora** Sleum., *Reinwardtia* 4, 1957, 176.

CELEBES. Central part, Rantemario, 3300 m, *Eyma 717*; Pintealón-Pokapindjang-Tinábang, *Eyma 601*.

**G. pernettyoides** Sleum., *Reinwardtia* 4, 1957, 184.

SUMATRA. Atjeh, Mt Losir, *Van Steenis 8637* (BO, fr.), 8648 (BO, isotype).

## 2. A new species and new records of the genus *Costera* J. J. S.

**C. loheri** (Merr.) Airy Shaw & J. J. S., *Bull. Jard. Bot. Btzig* III, 13, 1935, 421.

PHILIPPINES. Panay, Prov. Ilo-Ilo, Miagao, *Vidal 3146* (L, MA).

**C. sumatrana** J. J. S., *Bull. Jard. Bot. Btzig* III, 13, 1935, 421.

SUMATRA. Westcoast, between Kaju Arau and Bt. Sipatai, c. 1000 m, *Van Borssum Waalkes 2879* ('Pleyte 130': BO, K, L), on tree, fl. red, fr. white. Benkulen, Lebong, Pasir Lebar, on stony mud-flow, c. 1000 m, *De Voogd 1124* (BO, L), fl. white, fr. light green, rather common.

**C. lanaensis** (Merr.) Airy Shaw & J. J. S., *Bull. Jard. Bot. Btzig* III, 13, 1935, 421.

MOLUCCAS. Morotai, G. Pare ?, 1000 m, *Kostermans 1171* (BO, L), fr. green.

**C. cyclophylla** (Airy Shaw) J. J. S. & Airy Shaw in Airy Shaw, *Hook. Ic.* 1935, t. 3281.

BORNEO. Brunei, Bt. Pagon ridge, c. 1460 m, *Ashton BRUN 1056*, in mossy forest, fr. 3-1958. Sarawak, Merurong plateau, 730 m, *Brunig S 8884*; *ibid.*, Batu Eklap, 915 m, *Brunig s.n.*

**C. borneensis** J. J. S., *Bull. Jard. Bot. Btzig* III, 13, 1935, 423, f. 1.

BORNEO. Karimata Isl., P. Maja (Madjang), *Teysmann H.B. 6974* (BO, published as syntype of *C. ovalifolia* J. J. S., *Ic. Bog.* 4, 1910, 78).

**C. endertii** J. J. S., *Bull. Jard. Bot. Btzig* III, 13, 1935, 420.

BORNEO. Eastern part, W. Kutei, Mt Palimasan near Tabang on Belajan R., 300—500 m, *Kostermans 13014, 13141*, in *Agathis* forest on waterlogged, sandy, acid soil, fl. white or pink, fr. white.

**C. ovalifolia** J. J. S., *Ic. Bog.* 4, 1910, 77, t. 324.

BORNEO. Sarawak, Kuching, 9-1865, *Beccari P.B. 662* (FI). Melinau Terraces, 180 m, *Brunig s.n.* Bako Nat. Park, 120 m, *Brunig S 9922*. West Borneo, Mandor, 50 m, *Dunselman 86* (BO, L); G. Klam, *Hallier 2307* (BO, L). East Borneo, Tarakan, oilfield Sesanip, *Meijer 2501* (BO). Brunei, Sg. Lumut, *Sinclair c.s. 10427*, fr.

The specimen from the Melinau Terraces is the first ever collected with flowers since the type specimen (from the Karimata Arch.) was described, all other materials being sterile or in fruit; its corollas are 5—6 mm long and contain constantly 10 stamens, whilst the original plant was described with 3,5 mm long corollas and 5 stamens. The leaves of the type specimen (pre-

served at Leyden, the only flower lost) and those of the material enumerated here are similar to such an extent that I feel obliged to accept one species at least preliminarily.

With narrower leaves and thus approaching *C. endertii*:

BORNEO. North Borneo, Mt Kinabalu, Marai Parai, 1220—1525 m, *Clemens* 32401.

**C. tetramera** Sleum., nov. spec. — Scandens. Ramuli teretes, glabri, 1,5—3 mm diam., laxe foliati. Folia late elliptica usque subobovato-elliptica, apice rotundata, interdum brevissime retusa, basin versus late attenuata, basi ipsa subtruncato-obtusa ibique glandulis 2 marginalibus sat crassis parum prominentibus induta, coriacea, glabra, subtus per totam faciem laxe tuberculis epidermalibus adspersa, integra, in sicco parum, imprimis basin versus revoluta, (4,5—)6,5—9,5 cm longa, 3—5 cm lata, e basi et paullo supra basin 5—7-plinervia, costa inferne per 5 mm incrassata, superne cito angustata et cum nervis utrinque prominente, nervis interioribus utroque latere 2 alte ascendentibus et paullo infra laminae apicem conjunctis, venis laxis irregulariter transversis numerosioribus supra prominulis, subtus minus distinctis; petioli transverse rugulosi, 2—4 mm longi, 1,5—2 mm crassi. Flores ex axillis superioribus singuli rarius bini, in omnibus partibus exterioribus glabri. Pedicelli graciles, sub anthesi 0,9—1,5 cm longi, basi bracteolis 2 vel 3 angustis 1 mm longis circumdati. Calycis tubus subcylindrico-obconicus, 1 mm longus; limbus campanulato-patens, 1,5 mm altus, usque ad medium 4-lobus, lobis depresso-ovatis apiculatis. Corolla anguste campanulata, tenera, albida vel rosea, sub plena anthesi  $\pm$  usque ad medium 4-loba, tota 5 mm longa. Stamina 8; filamenta linearia, longeciliata, antice parcepilosa, dorso glabra, vix 2 mm longa; thecae anguste oblongae, 1,5 mm longae; tubuli graciles, parum divergentes, 1,5 mm longi. Discus depresso annularis, glaber. Stylus filiformis, glaber, 4,5 mm longus. Fructus immaturus calycis lobis inflexis 4 coronatus, pedicello c. 1,5 cm longo.

BORNEO. Eastern part, W. Kutei, Mt Palimasan near Tabang on Belajan R., *Kostermans* 12945 (A, BO, K; L, type), in mossy forest on acid, waterlogged sandy soil, fl. 12-9-1956; *ibid.*, *Kostermans* 12933 (BO, L), in mossy forest on sand, fr. imm. 11-9-1956.

### 3. New species and new records of the genus *Diplycosia* Bl.

**D. abscondita** Sleum., nov. spec. — Fruticulus terrestris, semidecumbens vel erectus, ramulis  $\pm$  ascendenti-curvatis in vivo brunneo-rubris, dense subadpresso setulis fuscis demum cineracentibus  $\pm$  2 mm longis instructis. Folia ad superiorem ramulorum partem conferta, ad apices subimbricata, elliptico-oblonga, apice subacuminata, subacuta, glandula crassiuscula terminata, basi late attenuata, subcoriacea, in sicco fusciscentia, supra lucidula, subtus  $\pm$  opaca, supra glabra, subtus et ad marginem subdense setulis fuscis basi incrassatis 1—2(—2,5) mm longis adspersa resp. ciliata, subtus tarde glabrescentia, 6—10 mm longa, 3—5 mm lata, margine subserrato-crenulata (dentibus setula terminatis), costa subtus tantum paullo prominente, supra minute impressa vel obscura, nervis venisque inconspicuis; petioli setulosi 1—1,5 mm longi. Flores in axillis superioribus distantibus solitarii. Pedicelli crassiusculi, curvati, sub anthesi 3—4 mm longi, setulosi, basi bracteolis 2 vel 3 ovatis glabris 1—1,5 mm longis instructi, infra calycem bibracteolati. Calyx campanulatus, c. 5 mm



longus, fere usque ad basin 5-fissus, extus subdense rufo-setulosus, lobis elongato-subovatis subacutis. Corolla subcampanulato-cylindrica, alba, membranacea, omnino glabra, 7—8 mm longa, antice 3—4 mm diam., lobis subacutis c. 2,5 mm longis, apice demum reflexis. Stamina 10, c. 7 mm longa; filamenta filiformia, glabra, alba, 4,5 mm longa; antherae brunnescentes, cum tubulis 3,5 mm longae, thecis ovato-oblongis, echinulatis, tubulis thecas longitudine subaequantibus sed iis multo angustioribus, filiformi-cylindricis, apice brevissime biaristatis. Ovarium laxe pilosum, pallide viride. Stylus albidus, glaber, gracilis, 7 mm longus.

BORNEO. North Borneo, Mt Kinabalu, rare ('abscondita') between Kambaran and Paka Cave, c. 2440 m, *Jacobs 5737* (L, type), fl. 15-10-1958; *ibid.*, Colombon R., 2895 m, *J. & M. S. Clemens 33843*, sterile, 30-6-1933.

Nearest to *D. barbiger* Sleum., but differing by much smaller leaves.

***D. kostermansii*** Sleum., nov. spec. — Fruticulus vix 10 cm altus, ramis paucis prostratis, gracilibus, radicanibus, 3—8 cm longis, dense subappresse fusco-setoso-pilosis et brevissime patenter pubescentibus, subdense foliatis. Folia elliptico-oblonga vel lanceolata, apice basique breviter attenuata, subcoriacea, paucicrenata, laxe ciliata, i.e. ad crenaturam quamque pilo setaceo fusco longo subadpresso demum caduco instructa, ceterum glabra vel hic inde pilo strigoso ornata, supra in sicco livida et opaca, subtus brunnescentia et nitentia, 6—8 mm longa,  $\pm$  2 mm lata, costa supra parum impressa, subtus vix indicata, ceterum evenia; 'stipulae' subulatae cito caducae; petioli graciles, vix 1 mm longi. Flores in axillis paucis interrupte digesti, solitarii. Pedicelli glabri, c. 1 mm longi, apice bracteolis 2 oppositis setaceo-ciliatis instructi. Calyx late campanulatus, 2 mm longus, usque ad medium 5-lobus, lobis triangularibus obtusis longe subsetoso-ciliatis, ceterum glabris. Corolla urceolata, 5-angulata, sat tenera, fere 7 mm longa, c. 3,5 mm diam., alba, ad angulos purpurascens, glabra, lobis deltoideis 1,5 mm longis. Stamina 10; filamenta linearia, inferne dilatata, glabra, 4,5—5 mm longa, parum undata; antherae sagittatae, 2 mm longae, thecis sat angustis echinulatis, tubulis thecis angustioribus easque aequantibus. Ovarium glabrum. Stylus columnaris, glaber, 4,5 mm longus.

BORNEO. East Borneo, W. Kutei, Mt Palimasan near Tabang on Belajan R., 800 m, *Kostermans 13066* (BO; L, type), in mossy forest on white, acid sands, fl. 15-9-1956.

Much related to *D. microphylla* Becc., but with much smaller leaves.

***D. subglobularis*** Sleum., nov. spec. — Frutex epiphyticus, c. 1 m altus. Ramuli divaricati, sat robusti, 1,5—3 mm diam., in partibus novellis densissime, in partibus vetustioribus dense vel gradatim laxius pilis setulosis rufis appressis 2(—3) mm longis obtecti, dense foliati. Folia elliptica, apice breviter attenuata vel rarius subrotundata, semper glandula crassa fere 1 mm prorumpente apiculata, basi late attenuata, coriacea, opaca, supra glabra, subtus in facie sparse vel sparsissime rufo-setulosa, ceterum densius appresse glanduloso-muriculata, novella subcrenolata et caduce setuloso-ciliata, matura subintegra, (1,5—)1,8—2,5 cm longa, (1—)1,2—1,5(—1,7) cm lata, margine parum revoluta, costa nervisque supra bene impressis, subtus subinconspicuis, nervis basalibus vel paullo suprabasalibus utroque latere 1, superioribus ex inferiore media vel tertia costae parte abientibus 1 (rarius 2)-paribus, omnibus alte curvato-ascendentibus et anastomosantibus; petioli initio setulosi, 2—3 mm

longi, c. 1 mm crassi. Flores in axillis superioribus numerosioribus solitarii. Pedicelli crassiusculi, laxe muriculati, sub anthesi 1—2, sub fructo usque ad 3 mm longi, infra calycem bracteolis 2 oppositis ovatis ciliatis vix 1 mm instructi. Calyx campanulatus, glaber, tubo 0,5—0,7 mm longo, lobis subovato-deltoides, obtusis, (1—)1,5 mm longis, glanduloso-fimbriatis. Corolla subglobularis, apice valde contracta vel fere apiculata, cito caduca, c. 2 mm alta, c. 2,5 mm diam., utrinque glabra, pallide rosea, carnosula, lobis erectis vix 0,5 mm longis. Stamina 10; filamenta subulata, glabra, 0,8—1 mm longa; antherae ovato-oblongae, echinulatae, tubulis incl. 0,8 mm longae, tubulis ipsis contractis c. 0,3 mm longis. Ovarium glabrum. Stylus gracilis, glaber, sub anthesi 1—1,5, in fructu 1,5—2 mm longus. Fructus immaturus c. 2,5 mm diam., dilute azureus.

NEW GUINEA. Central part, Star Mts, 1 km E. of the mouth of the Minam R. into the Bon R., 1500 m, *Kalkman 3482* (L, type), on peaty soil.

Related to *D. apoensis* Elm. in leaf characters, but quite distinct in the very small subglobular corolla.

**D. stellaris** Sleum., nov. spec. — Frutex humilis, c. 0,3 m altus. Ramuli in partibus juvenilibus laxe subpatenter rufo-setoso-pilosi, in partibus vetustioribus iam griseo-corticatis hic inde setula instructi, subdense vel laxius foliati. Folia obovata vel obovato-, rarius subrotundato-elliptica, apice rotundata vel levissime emarginata glandulaque crassa prorumpente apiculata, basi late in petiolum cuneata, coriacea, in foliis immaturis subtus ad costam passim pilo setaceo instructa, ad marginem setaceo-ciliata, maturitate pilis glandulosis brevissimis muriculatis sparse obviis exceptis glabra, eciliata, margine regulariter sub serrato-crenulata (dentibus 1—2 mm distantibus) et imprimis basin laminae versus  $\pm$  revoluta, costa nervisque supra bene impressis, subinconspicuis, nervis basalibus utroque latere 1, suprabasalibus 1—2-paribus, curvato-ascendentibus et anastomosantibus, nervis aliis vel venis altius a costa abeuntibus brevioribus supra levissime insculptis vel obscuris; petioli supra canaliculati, 4—5(—6) mm longi, 1—1,5 mm crassi, superne interdum lamina brevissime decurrente subalati. Flores (1—)2—3 per fasciculum dispositi, in axillis superioribus orti, nutantes. Pedicelli laxe vel laxissime subadpresse setuloso-pilosi vel muriculati, sub anthesi (1—)1,2—1,5(—1,8) cm longi, sat graciles. Calyx inferne infundibuliformi-attenuatus, totus 5 mm longus, basi bracteolis 2 oppositis ovatis 1—1,2 mm longis ciliolatis fultus, rubescens, minute rugulosus et muriculatus, lobis ovato-triangularibus, subacutis, ciliolatis et glanduloso-fimbriatis, fere 2 mm longis. Corolla cylindrico-urceolata, tenera, rosea, intus ad lobos albescens, glabra, sub plena anthesi c. 9 mm longa et 4 mm diam., lobis obtusis subrectis 1 mm longis. Stamina 10, c. 6,5 mm longa; filamenta anguste linearia, glabra, leviter undata, c. 4 mm longa; antherae oblongae, cum tubulis 3 mm longae, granulatae, tubulis apicem versus angustioribus c. 1,2 mm longis. Ovarium glabrum. Stylus graciliter columnaris, glaber, 5,5 mm longus.

NEW GUINEA. Central part, Mt Antares, 3300 m, *Kalkman 4515* (L, type), in alpine shrub vegetation, rather rare, fl. 25-7-1959.

**D. kjellbergii** J. J. S., Bot. Jahrb. 68, 1937, 206; Sleum., Reinwardtia 4, 1957, 122, in clavi.



CELEBES. Southeastern part, Porema (S. of Malili), 1500 m, *Kjellberg 3913* (S, type).

The species (nr. 19) has been omitted in the enumeration of the material in my revision above mentioned.

**D. glauciflora** Sleum., *Reinwardtia* 4, 1957, 137.

SUMATRA. Atjeh, Gajo Alas lands, near Simpang tiga, 1000—1500 m, *Fairchild 140* (BO). Eastcoast, G. Pinto, E. of Lake Toba, Pangkulubau, 2000—2120 m, *Lörzing 17120*. Sibolangit, G. Pinto, 1800 m, *Lörzing 994, 13870*. Karo plateau, Dolok Baros, 1800—1950 m, *Lörzing 16237*. Tapanuli, Dolok Sopo Raso, Toba, *R. Si Boeea 11149*.

**D. morobeensis** Sleum., *Bot. Jahrb.* 72, 1942, 210; *Reinwardtia* 4, 1957, 140.

var. *morobeensis*.

NEW GUINEA. Central part, Star Mts, Mt Antares, 2360—3000 m, *Kalkman 4466, 4472*. Eastern Highlands, above Goroka, 2530 m, *N. G. F. 6135 Womersley & Floyd*; Collins Mill, Omahaiga R. valley, 2440 m, *Robbins 873*; near Daulo camp, Asaro-Mairi Divide, 2400 m, *Hoogland & Pullen 5419*.

var. *ovatifolia* Sleum., l.c.

NEW GUINEA. Eastern Highlands, Mt Otto, 2750 m, *Brass 31040* (corolla 5 mm).

**D. rupicola** Sleum., *Reinwardtia* 4, 1957, 140.

NEW GUINEA. Western Highlands, Mt Hagen, 3350 m, *Robbins 340*; *ibid.*, Tomba, lower slopes, 2500 m, *Robbins 294*, in lower montane rain forest, a form (apparently grown in the shadow) with longer and more slender pedicels and paler corollas. Eastern Highlands, Mt Michael, 3100—3290 m, *Brass & Collins 31291*.

**D. scabrida** Becc., *Malesia* 1, 1878, 211; Sleum., *Reinwardtia* 4, 1957, 144.

BORNEO. Eastern part, W. Kutei, Mt Palimasan near Tabang, on Belajan R., 700 m, *Kostermans 12822*, epiphyte in *Agathis* forest; same locality, 800 m, *Kostermans 13116 A*, very similar in general, but leaves more roundish, and with a fine puberulence besides the bristles on the young branchlets, possibly a different species, flowers wanted.

**D. elliptica** Ridl., *J. Fed. Mal. St. Mus.* 10, 1920, 145; Sleum., *Reinwardtia* 4, 1957, 145.

SUMATRA. Eastcoast, Talun na Uli, *R. Si Boeea 10201*; Lumban Lobu, Toba, *R. Si Boeea 10835, 11425*; Dolok Parhorasan, Asahan, *R. Si Boeea 10991*. Mt Sibayak, 950 m, *Lörzing 15816*.

BORNEO. Sarawak, Bungo Ra., 1065 m, *Brunig 7621*. Bukit Eklap, Merurong plateau, 1035 m, *Brunig s.n.*

**D. microphylla** Becc., *Malesia* 1, 1878, 212; Sleum., *Reinwardtia* 4, 1957, 146.

BORNEO. Sarawak, Mt Poi, 1220 m, *Purseglove 4753*. East Borneo, W. Kutei, Mt Palimasan near Tabang on Belajan R., 600 m, *Kostermans 12841*, epiphyte in *Agathis* forest.

**D. lorentzii** Koord., *Nova Guinea* 8, 1912, 881, t. 54, f. 3, a—e; Sleum., *Reinwardtia* 4, 1957, 153. — *Dimorphanthera obovata* J. J. S., *Med. Rijksherb.*

25, 1915, 8, quoad folia; Nova Guinea 12 (5), 1917, 514; l.c. 1918, t. 208, quoad folia, nom. illeg. (Code § 66).

NEW GUINEA. Southern part, Perameles Mts, 900 m, *Pulle* 434 *p.p.* (BO, type of *Dimorphanthera obovata*, as to the leaves; L).

**D. rubella** Sleum., *Reinwardtia* 4, 1957, 148.

SUMATRA. Westcoast, Mt Sago, near Pajakumbuh, summit region, 1700—1800 m, *Meijer & Vermeulen* 5458, epiphyte on low tree in mossy forest, fl. 15-12-1956.

The new material allows to extend the original description in all flowering parts; the complete description will be published in 'Flora Malesiana'.

**D. pittosporifolia** J. J. S., *Bull. Jard. Bot. Btzig* III, 13, 1935, 460.

var. **punctiloba** Sleum., *Reinwardtia* 4, 1957, 152.

BORNEO. North Borneo, Mt Kinabalu, below Kamarangan wireless station, 2100 m, *Sinclair c.s.* 9050, rare epiphyte in ridge forest.

**D. kalmiiifolia** Sleum., *Bot. Jahrb.* 71, 1940, 154.

BORNEO. Sarawak, Bintulu, Merurong plateau, 230 m, *Brunig* S 8881, fr.

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# FLORAE MALESIANAE PRECURSORES XXVIII

## THE GENUS VACCINIUM IN MALAYSIA

by

H. S L E U M E R

(Rijksherbarium, Leiden)

(Issued 1, XII. 1961)

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Within the genus *Vaccinium* L. this revision of its Malaysian species — which comprises more than half of the total number of species of the genus — is the last in a series of modern treatments made for North America by W. H. Camp, for the Pacific area by C. Skottsberg, and for tropical America and tropical Asia by the present author. The work formerly done in Malaysian *Vaccinium* has been limited to islands, as that by J. J. Smith and Schlechter for a part of New Guinea, by Copeland f. for the Philippines, and by Amshoff for Java, with the shortcomings necessarily connected with such too local work.

The sections proposed for the Malaysian species in my general system in 1941 have been found still useful and are kept here except a nomenclatural change in one section and the expansion in species due to the large amount of indetermined material collected in Celebes and especially in New Guinea.

The present work gives the basis of my treatment of *Vaccinium* to appear in the Flora Malesiana, where descriptions of all species in English language will be found; it offers a key to the sections and species, the Latin descriptions of the new taxa, and the localities of all species taken from a large number of herbarium specimens which have been kindly lent through the courtesy of the Directors of the following institutions:

Arnold Arboretum (A)	Leyden (L)
Bogor (BO)	Lae (LAE)
Canberra (CANB)	Melbourne (MEL)
Edinburgh (E)	New York (NY)
Florence (FI)	Stockholm (S)
Gray Herbarium (GH)	Kuching (SAR)
Kepong (KEP)	Singapore (SING)

The material preserved in

British Museum Nat. Hist. (BM)  
Geneva (G)  
Kew (K)  
Paris (P)  
Utrecht (U)

has been studied during a stay in these herbaria.

The Malaysian specimens in the herbaria of Berkeley (UC) and Washington (US) have not been examined by the author because they have, as far as the Philippines are concerned, formerly been revised by Dr. H. F. Copeland, and are cited in his paper; most of these specimens are represented by duplicate numbers in the other herbaria mentioned above.

A † means, that the specimen is lost and has not been seen by me. I have, however, studied the whole of the Berlin material before its destruction.

**Vaccinium** L., Syst. 1, 1753, 349; G. Don, Gen. Syst. 3, 1834, 851; DC., Prodr. 7, 1839, 565; Miq., Fl. Ind. Bat. 2, 1859, 1060; Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 36; Benth. & Hook. f., Gen. Pl. 2, 1876, 573; Becc., Malesia 1, 1878, 209; Clarke in Hook. f., Fl. Br. Ind. 3, 1882, 451; Drude in E. & P., Pfl. Fam. 4 (1), 1889, 51; K. & G., J. As. Soc. Beng. 74, ii, 1905, 60; Koord., Exk. Fl. Java 3, 1912, 11; Koord.-Schum., Syst. Verz. 1912, fam. 233, p. 108; J. J. S. in K. & V., Bijdr. 13, 1914, 135; Nova Guinea 12 (2), 1914, 154; l. c. 12 (5), 1917, 518; Schltr., Bot. Jahrb. 55, 1918, 167; Koord., Fl. Tjib. 1918, fam. 233, p. 7; Ridl., Fl. Mal. Pen. 2, 1923, 206; Copel. f., Philip. J. Sc. 42 (4), 1930, 537; Dop in Fl. Gén. I.-C. 3, 1930, 703; J. J. S., Nova Guinea 18, 1936, 108; Sleum., Bot. Jahrb. 71, 1941, 413; l. c. 72, 1942, 216; Amsh. in Back., Bekn. Fl. Java (em. ed.) 7, 1948, fam. 163, p. 1. — *Thibaudia* (non R. & P. in St. Hil.) Bl., Bijdr. 1826, 859. — (*Gay*) *Lussacia* (non H. B. K.) Bl., Bijdr. 1826, 861. — *Agapetes* (non G. Don) aut. var.

Lectotype: *V. myrtilus* L.

### Key to the sections

- 1.a. Corolla (campanulate, thick-fleshy, deeply 5-partite) seemingly consisting of 2 layers, the outer one thick, split at the lobes to nearly the base of the corolla, the inner thinner, less deeply split, forming a kind of decurrent membranous marginal zone towards the sinuses. (Tubules opening by introrse rather long slits.)  
Sect. **Pachyanthum** (p. 11)
- b. Corolla (of various shape, thin to fleshy, 5-partite to various degree) consisting of one homogeneous layer, showing no membranous wing at the sinuses. . . . . 2
- 2.a. Tubules opening by elongate introrse slits, which attain  $\frac{1}{3}$  to  $\frac{1}{2}$  of the total length of the tubules . . . . . 3
- b. Tubules opening by relatively short introrse slits or (sometimes terminal) pores . . . . . 4
- 3.a. Corolla campanulate, 5-partite  $\pm$  halfway. Anthers with long dorsal spurs (1—1.5 mm), the tubules  $\pm$  double as long as the thecae  
Sect. **Galeopetalum** (p. 13)
- b. Corolla urceolate to subglobose, shortly 5-lobed. Anthers with short or rather inconspicuous dorsal spurs, the tubules  $\pm$  as long as the thecae  
Sect. **Rigiolepis** (p. 14)
- 4.a. Flowers solitary. Peduncle, if any, very short . . . . . Sect. **Oarianthe** (p. 22)
- b. Flowers in distinct few- to many-flowered racemes, which may be reduced partially to a 2- or even 1-flowered inflorescence (which then bears a distinct peduncle) . . . . . 5
- 5.a. Calyx lobes elongate-subulate, 2—4 times as long as the calyx tube  
Sect. **Neojunghunia** (p. 37)
- b. Calyx lobes usually as long as or shorter than the calyx tube (if subulate, never exceeding the latter) . . . . . 6
- 6.a. Flowers each subtended by a conspicuous,  $\pm$  foliaceous bract, which persists at least for some time during anthesis . . . . . Sect. **Bracteata** (p. 41)
- b. Flowers subtended by a small, not foliaceous, generally (very) early caducous bract, which mostly has at least gone in the start of the anthesis  
Sect. **Nesococcus** (p. 57)



1. Sect. **Pachyanthum** Sleum., Bot. Jahrb. 71, 1941, 417; l. c. 72, 1942, 217.

Type species: *V. macbainii* F. v. M.

The section is confined to the Eastern half of New Guinea.

### Key to the species

- 1.a. Calyx relatively large at anthesis, (5—)6—7 mm long including the lobes, which are 1,5—2(—2,5) mm long; calyx tube subcampanulate to broadly cylindrical . . . 2
- b. Calyx relatively small at anthesis, (2—)3—4(rarely up to 5) mm long including the lobes, which are 0,5—1(rarely up to 1,5) mm long; calyx tube generally semiglobose to subsemiglobose-cylindrical, or sometimes subcylindrical, 2—3 mm in diam. at anthesis . . . 3
- 2.a. Calyx tube subcampanulate, c. 4 mm in diam. at anthesis. Leaves very coriaceous, stiff, minutely but well visibly denticulate or crenulate, ovate or ovate-oblong, rarely oblong or suborbicular, 2—4(—4,5) by (1,3—)1,5—2(—2,5) cm . . . 1. **V. macbainii**
- b. Calyx tube subcampanulate to broadly cylindrical, (3—)4(—5) mm in diam. at anthesis. Leaves entire, coriaceous, but less stiff, obovate to broad-elliptic or ± rounded, (5,5—)7—9(—11) by (3,5—)4—5,5(—8,5) cm . . . 2. **V. ingens**
- 3.a. Leaves ovate, (acuminate, 7—12(—14) by 3,5—5,5(—7,5) cm). Pedicels without a collarette of glands at the very apex below the calyx . . . 3. **V. fissiflorum**
- b. Leaves of other form (mostly smaller). Pedicels with a collarette of numerous ± spreading glands or glandular hairs at the very apex just below the calyx . . . 4
- 4.a. Collarette consisting of thick and ± flattish, subsubulate glands which rarely occur also on the calyx and the pedicels . . . 5
- b. Collarette consisting of slender (not flattened), less thickish glandular hairs, which may occur also on the calyx and the pedicels . . . 6
- 5.a. Leaves oblong to elliptic-obovate, rarely more elliptic-oblong or elliptic, obtuse or mostly rounded at the apex, (3—)5—8(—11) by (1,6—)2,5—3,5(—5,5) cm . . . 4. **V. keysseri** var. **keysseri**
- b. Leaves ± oblong, shortly subacutely acuminate at the apex, 4—7 by 1,8—3 cm . . . 4. **V. keysseri** var. **acutatum**
- 6.a. Leaves large, (5—)6—9,5 by 3—5,5 cm (obovate or obovate-elliptic) . . . 5. **V. amplifolium** var. **giganteum**
- b. Leaves smaller, of various form . . . 7
- 7.a. Leaves subovate-elliptic, broad-elliptic or suborbicular, or if elliptic-oblong, over 4 cm long . . . 5. **V. amplifolium** var. **amplifolium**
- b. Leaves obovate-elliptic, oblong-obovate or oblong . . . 8
- 8.a. Leaves obovate-elliptic or oblong-obovate . . . 5. **V. amplifolium** var. **stabilipes**
- b. Leaves oblong or elliptic-oblong and rather small (1,5—3(—4) by (0,8—)1—1,5 cm) . . . 5. **V. amplifolium** var. **oblongum**

1. **V. macbainii** F. v. M., Trans. R. Soc. Vict. n. s. 1 (2), 1889, 17; Wright, Kew Bull. 1899, 103; Sleum., Bot. Jahrb. 72, 1942, 220.

NEW GUINEA. Southeastern part, Centr. Distr., Mt Knutsford, *McGregor anno 1889* (K, type). Mt Scratchley, 3050—3960 m, *Giulianetti anno 1896* (K, MEL). Mt Albert Edward, 3680 m, *Brass 4242, 4293, 4335, 4336* (pedicels finely pubescent), 4423.

2. **V. ingens** Sleum., Bot. Jahrb. 72, 1942, 220.

NEW GUINEA. Southeastern part, Morobe Distr., Kaindi (= Wau), 2060 m, *Brass 29564, 29567*. Centr. Distr., Mt Tafa, 2400 m, *Brass 4845* (A, BO, L; NY, type, † in B); Matate-Lala Divide, 2440 m, *Carr 15008*; Alola, 1890 m, *Carr 13641*. Mt Yule, *McGregor anno 1890*.

3. **V. fissiflorum** Sleum., Bot. Jahrb. 72, 1942, 219.

NEW GUINEA. Eastern part, Western Highlands, near Wankl village, c. 5 km SE of Mt Hagen station, 2200 m, *Hoogland & Pullen 5881*. Eastern Highlands, near Daulo

camp, Asaro-Mairi Divide, 2400 m, *Hoogland & Pullen* 5493; Dengalagu Mission, Upper Chimbu valley, 1980 m, *N. G. F. 8888 Womersley*; Purosa, Okapa area, 2000 m, *Brass* 31846; Asaro-Mairifuca Divide, 2440 m, *Pullen* 474. Morobe Distr., Sattelberg area, Samanzing, 2000—2300 m, *Clemens* 9426 (B, type, †); Sambanga, 1700—2000 m, *Clemens* 7120 (B, †).

4. *V. keysseri* Schltr ex Diels, Bot. Jahrb. 62, 1929, 488; Sleum., l. c. 72, 1942, 219.

var. *keysseri*.

NEW GUINEA. Eastern part, Morobe Distr., Mt. Saruwaged, 3000—3800 m, *Keysser s.n.* (B, type, †; BM, 'n. 169'); *Clemens* 5637, 5889, 7291, 9846 (B), 10076, 10108 (B, †); Samanzing, 2300—2600 m, *Clemens* 9383. Ulap Trail, 3050 m, *Clemens* 41165 (A). Eastern Highlands, Mt Wilhelm, 3350—3655 m, *Semple & Rayner s.n.*; *N. G. F. s.n. Keogh*; *N. G. F. 8832 Womersley*; *Hoogland & Pullen* 5633; *Robbins* 1159; *Brass* 29815, 30693; *Barrett* 11. Mt Kerigomna, Goroka subdistr., 3300 m, *Hoogland & Pullen* 5566. Mt Elandora, 2530 m, *Brass & Collins* 32152. Mt Michael, 3300 m, *Brass & Collins* 31280. Western Highlands, Mt Hagen, 3350 m, *Robbins* 334. Kubor Range, Mt Kinkain, 3410—3600 m, *Pullen* 221 A (CANB); *Saunders* 739. Wahgi-Jimmy Divide, *N. G. F. 5320 Womersley*.

var. *acutatum* Sleum., nov. var. — A typo foliis angustioribus  $\pm$  oblongis apice breviter subacute acuminatis utrinque punctatis, 4—7 cm longis, 1,8—3 cm latis differt.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Wilhelm, Lake Aunde vicinity, 3500 m, fl. 8-1956, *N. G. F. 8926 Womersley* (BM, BRI, K; L, type; LAE, SING).

5. *V. amplifolium* F. v. M., Trans. R. Soc. Vict. n. s. 1 (2), 1889, 18; Sleum., Bot. Jahrb. 72, 1942, 219.

var. *amplifolium*.

NEW GUINEA. Eastern part, Centr. Distr., Mt Musgrave, *McGregor anno 1889* (MEL, type); *ibid.*, 2800 m, *McGregor anno 1889* (MEL). Mt Victoria, *McGregor anno 1889* (MEL). Summit of Owen Stanley Range, *McGregor anno 1889* (MEL). Summit of Mt Knutsford, *McGregor anno 1889* (MEL). Mt Scratchley, 3050—3960 m, *Giulianetti anno 1896* (K). Ascent to Mt Victoria, 'The Gap', 2135—2440 m, *Carr* 13868, 15111, 15139 p.p., 15267. Murray Pass, Wharton Range, 2840 m, *Brass* 4518. Milne Bay Distr., N slopes of Mt Dayman, Maneau Range, 2050—2150 m, *Brass* 22815, 22954.

var. *giganteum* Sleum., nov. var. — Folia pro specie ampla, obovata vel obovato-elliptica, (5—)6—9,5 cm longa, 3—5,5 cm lata.

Leaves similar to those of *V. ingens*, but calyces much smaller.

NEW GUINEA. Eastern part, Wau-Salamaua road, near Skindeway, 1645 m, fl. defl. 7-1-1956, *N. G. F. 8448 Womersley & Millar* (A, CANB, K; L, type; LAE, SING); *ibid.*, *N. G. F. 8350 Womersley & Millar* (leaves more attenuate at the apex).

var. *stabilipes* (Sleum.) Sleum., nov. stat. — *V. stabilipes* Sleum., Bot. Jahrb. 72, 1942, 218.

NEW GUINEA. Eastern part, Eastern Highlands, above Goroka, 2530 m, *N. G. F. 6127 Womersley & Floyd*; Omahaiga R. valley, 2590 m, *Robbins* 838; Mt Otto, 2680 m, *Brass* 30887. Morobe Distr., Abe, Mt Saruwaged area, 1220—1830 m, *Clemens* 8320 A (A, B). Centr. Distr., Murray Pass, Wharton Range, 2840 m, *Brass* 4750 (A, BO, K, L, MEL; NY, type of *V. stabilipes*, † at B). Mt Tafa, 2300 m, *Brass* 4038. Boridi, 1525—1830 m, *Carr* 14370, 14614; ascent to Mt Victoria, 'The Gap', c. 2135 m, *Carr* 15139 p.p. Milne Bay Distr., Goodenough Isl., 1700 m, *Brass* 24558.



var. **oblongum** Sleum., nov. var. — *V. oblongum* Wright, Kew Bull. 1899, 103, nec *V. oblongum* Greene 1897. — *V. atrescens* Sleum., Bot. Jahrb. 72, 1942, 218 (based on *V. oblongum* Wright).

NEW GUINEA. Eastern part, Eastern Highlands, Mt Otto, 3040—3460 m, *Brass* 30960, 30983; *Brass & Collins* 31029. Mt Michael, 2900—3100 m, *Brass & Collins* 31309; *N. G. F.* 11437 *Womersley*. Centr. Distr., Mt Scratchley, 3050—3960 m, *Giulianetti* anno 1896 (K, type of *V. oblongum*). Murray Pass, Wharton Range, 2840 m, *Brass* 4666.

2. Sect. **Galeopetalum** (J. J. S.) Sleum., Notizbl. Bot. Gart. Mus. Berlin-Dahlem 13, 1936, 115; Bot. Jahrb. 71, 1941, 418, 441. — *V.* subgen. *Galeopetalum* J. J. S., Ic. Bog. 4, 1912, 101; in K. & V., Bijdr. 13, 1914, 141 ('*Galeipetalum*').

Type species: *V. dialypetalum* J. J. S.

6. ***V. dialypetalum*** J. J. S., Ic. Bog. 4, 1912, 99, t. 331; in K. & V., Bijdr. 13, 1914, 140; Costerus & Smith, Ann. Jard. Bot. Btzg ser. 2, 29, 1916, 91; Sleum., Bot. Jahrb. 71, 1941, 424. — *Agapetes griffithii* (non Clarke in Hook. 1882) K. & G., J. As. Soc. Beng. 74, ii, 1905, 59; Ridl., J. Fed. Mal. St. Mus. 8, 1917, 56; Burk. & Holtt., Gard. Bull. Str. S. 3, 1923, 56. — *Agapetes parviflora* Ridl., J. Str. Br. R. As. Soc. 61, 1912, 26 (non Dunn 1903, nec *V. parviflorum* Andr. 1800). — *Agapetes micrantha* Ridl., Fl. Mal. Pen. 2, 1923, 205 (apparently based on *Agapetes parviflora* Ridl.); Burk. & Holtt., Gard. Bull. Str. S. 3, 1923, 57 (nec *V. micranthum* Dunal 1839). — *Agapetes perakensis* Ridl., Fl. Mal. Pen. 2, 1923, 205; Burk. & Henders., Gard. Bull. Str. S. 3, 1925, 390; Henders., J. Mal. Br. R. As. Soc. 5, 1927, 255 (nec *V. perakense* Ridl. 1919). — *Agapetes wrayi* Ridl., Fl. Mal. Pen. 2, 1923, 205 (nec *V. wrayi* Ridl. 1918). — *Agapetes pubescens* Ridl., J. Bot. 62, 1924, 298; Fl. Mal. Pen. 5, 1925, 318; Henders., Gard. Bull. Str. S. 4, 1926, 98 (nec *V. pubescens* Wormsk. ex Hornem. 1816). — *V. urophyllum* Merr., Pap. Mich. Ac. Sc. 19, 1934, 184; Amsh. in Back., Bekn. Fl. Java (em. ed.) 7, 1948, fam. 123, p. 2. — *V. pauciflorum* Fletcher, Kew Bull. 1936, 37; in Fl. Siam. En. 2, 1938, 313; Sleum., Bot. Jahrb. 71, 1941, 446. — *V. longilingua* Sleum., Bot. Jahrb. 71, 1941, 424 (based on *Agapetes perakensis* Ridl.). — *V. ridleyi* Sleum., l. c. (based on *Agapetes parviflora* Ridl.). — *V. longipes* Sleum., l. c. (based on *Agapetes wrayi* Ridl.).

*V. dialypetalum* was described by J. J. Smith with corollas reduced in size and 5-partite to nearly the base, which occur sometimes within the genus and possibly are due to insects. It seems to me at least questionable to discard this name as 'based on a monstrosity' (§ 67), because the many other characters given by the author are those of a normal plant. If this name nevertheless is not accepted (as by Amshoff in Back., Bekn. Fl. Java, 1948), then the next legitimate name will be *V. urophyllum* Merr. for this so often described and combined species.

SIAM. Nakawn Sritamarat, Patalung, Kao Soi Dao, 600 m, *Kerr* 19215 (ABD, type of *V. pauciflorum*, not seen; BM, K); Songkla, Kao Keo, 700 m, *Kerr* 15944.

SUMATRA. Atjeh, Laut Pupandji, 1900 m, *Van Steenis* 6539; Kongke-Gumpang, 1000 m, *Van Steenis* 9504; Losir massif, upper course of Lau Alas R., 2100—2250 m, *Van Steenis* 8439. Eastcoast/Tapanuli, Talun na Uli, R. Si Bozea 10958. Westcoast, G. Singgalang, 1700—2500 m, *Bünnemeijer* 2881; *Yates* 2427 (BO; NY, type of *V. urophyllum*); *Beccari* P. S. 23. G. Kerintji, 1200—2200 m, *B. Kloss & Robinson* 86, 158; *Bünnemeijer* 9543, 9719, 9869, 10147, 10325, 10337; *Jacobs* 4331. G. Talamau,

1400—2000 m, *Bünnemeijer* 701, 741, 896, 906. G. Malintang, 1800—2100 m, *Bünnemeijer* 3926, 4102. G. Merapi, 1500—1600 m, *Schiffner* 2405; *Meijer* 3452. Benkulen, Aer Ketenong, 600 m, *Rappard* 208.

MALAY PENINSULA. Perak, Maxwells Hill, 925—1160 m, *Burkill & Haniff* SF 12682; *Ridley* 5532 (K, type of *Agapetes perakensis*); *Sinclair & Kiah* SF 38631. G. Batu Puteh, *Wray* 1071. Larut, 855—1220 m, *Kunstler* 3831, 6363, 8051; *Scortechini* s.n. Thaipung Hill, 945—1000 m, *Haniff & Nur* SF 2479; *Henderson* F.M.S. Mus. 11836. Cameron Highlands, 1125—1465 m, *For. Dep. F.M.S.* 25958 *Symington*; *Henderson* SF 17756; *Henderson* F.M.S. Mus. 11189; *ibid.*, Ulu Sungei, *For. Dep. F.M.S.* 37544 *Jaámat*; Sg. Batam, 1095 m, *Henderson* F.M.S. Mus. 11133; G. Batu Brinchang, 1525 m, *Symington* C.F. 20986, 21005; Robinson Falls, 1465 m, *Henderson* SF 17756. No locality given, *Wray* s.n. (K, type of *Agapetes wrayi*). Pahang, Fraser Hill, 1220—1330 m, *For. Dep. F.M.S.* 7828 *Burkill & Holtum* (K, type of *Agapetes pubescens*; SING); *Corner* s.n.; *ibid.*, S. Yeh, *Nur* SF 11088. Pine Tree Hill, *Burkill & Holtum* SF 8537. G. Gerolak, *For. Dep. F.M.S.* 27554 *Jaámat*. Trengganu, G. Padang, 1220 m, *Moysey & Kiah* SF 31872. Selangor, Sempang Mines, *Ridley* 15768 (K, type of *Agapetes parviflora* and *Agapetes micrantha*). Malacca, Mt Ophir, *Griffith* s.n.

JAVA. Preanger, Kartamana near Bandung, 1st ridge G. Malabar-G. Wajang, c. 1600 m, *Rant & Smith* 513 (BO, type of *V. dialypetalum*). G. Patuha, 1700 m, *Van Steenis* 7441. Prut, ridge between G. Gegerbintang and G. Pangrango, 2100 m, *Van Steenis* 5021, sterile.

3. Sect. *Rigiolepis* (Hook. f.) J. J. S., Ic. Bog. 4, 1910, 69, in text; Sleum., Bot. Jahrb. 71, 1941, 419. — *Rigolepis* Hook. f., Ic. Pl. 12, 1876, 54, t. 1160, pr. gen.; Benth. & Hook. f., Gen. Pl. 2, 1876, 572; Niedenzu, Bot. Jahrb. 11, 1889, 246; Drude in E. & P., Pfl. Fam. 4 (1), 1889, 49; Ridl., Kew Bull. 1922, 106; Copel. f., Philip. J. Sc. 47, 1932, 103; J. J. S., Blumea 1, 1935, 323—342.

Type species: *V. borneense* W. W. Sm. (= *Rigiolepis borneensis* Hook. f.).

I cannot follow Hooker f., Ridley and J. J. Smith in regarding *Rigiolepis* as a proper genus next to *Vaccinium*, as not a single character would separate these genera. Among others, Vuyck (in Boerlage, Handl. 2 (1), 1891, 263) and Amshoff (in Back., Bekn. Fl. Java (em. ed.) 7, 1948, fam. 163, p. 2) have already united them. *Rigiolepis* finds its place as a section in *Vaccinium* near sect. *Galeopetalum*, with which it shares the cleft-like introrse pore of the tubules, being different in shorter tubules, shorter spurs and mainly by the relatively small, urceolate to subglobular, shortly 5-lobed corolla.

As many species of this section are described from incomplete material, lacking flowers and/or fruits, the key to the species is based mainly on vegetative characters. The small flowers show but slight differences, difficult to handle in a key anyway.

### Key to the species

- 1.a. Bracts, bracteoles and calyx lobes strongly veined resp. costulate by several deeply impressed nerves parallel to the edge . . . . . 2
- b. Bracts, bracteoles and calyx lobes not or but very indistinctly veined . . . . . 5
- 2.a. Racemes much reduced in length and number of flowers (occasionally to a solitary flower); rhachis 0—1 cm . . . . . 3
- b. Racemes generally well developed and  $\pm$  many-flowered; rhachis normally exceeding 1 cm . . . . . 4
- 3.a. Leaves (narrow-)lanceolate, (3—)4—6(—8) by (0,5—)0,7—1(—1,2) cm. *Borneo*  
7. *V. lanceifolium*
- b. Leaves ovate to (broadly) lanceolate-ovate, (2—)2,5—5 by 1—1,5(—2,5) cm. *Borneo*  
8. *V. lobbii*



- 4.a. Leaves elliptic to lanceolate-elliptic, rarely subovate-elliptic, apex acuminate to subcaudate-acuminate, (6—)7,5—15(—16) by (1,8—)3—5,5(—6) cm. *Borneo* 9. *V. borneense* var. *borneense*
- b. Leaves ovate-lanceolate, apex caudate-acuminate, 5,5—10(—12) by 1,3—2,1 (—3,2) cm. *Borneo* 9. *V. borneense* var. *poianum*
- 5.a. Flowers solitary (or rarely 2 in a fascicle), no rhachis present . . . . . 6
- b. Flowers in distinct, mostly elongate racemes . . . . . 7
- 6.a. Corolla and calyx glabrous or nearly so. *Borneo* . . . . . 10. *V. monanthum*
- b. Corolla and calyx  $\pm$  densely and patently hirsutulous. *Borneo* 11. *V. uniflorum*
- 7.a. Leaves predominantly penninerved, i.e. the basal plinerves not or not much conspicuous, the upper pinnate ones, coming from the upper  $\frac{3}{4}$  part of the midrib, generally much more distinct . . . . . 8
- b. Leaves exclusively plinerved, i.e. the proper main-nerves from and from somewhat above the base and high curved-ascending to  $\pm$  the top of the lamina, other nerves or veins  $\pm$  transversely from the upper part of the midrib short and much less conspicuous or  $\pm$  inconspicuous at all . . . . . 12
- 8.a. Leaves large, 20—30 by (6—)6,5—9 cm. *Borneo* 12 *V. megaphyllum* var. *megaphyllum*
- b. Leaves up to 19 by 6 cm . . . . . 9
- 9.a. Leaves (12—)14—19 by 4—6 cm. *Borneo* 12. *V. megaphyllum* var. *adenophorum*
- b. Leaves up to 16 by 4 cm . . . . . 10
- 10.a. Leaves (4,8—)6—10 by (0,8—)1,6—2,3 cm. (Pedicels filiform, 5(—6) mm at anthesis. Corolla 4 mm.) *Borneo* . . . . . 13. *V. capillipes*
- b. Leaves 8,5—16 by 2—4 cm . . . . . 11
- 11.a. Pedicels rather stoutish and 1,5—3(—5) mm long at anthesis. Corolla 4 mm. *Borneo* 14. *V. kemulense*
- b. Pedicels filiform and 6—8 mm long at anthesis. Corolla c. 2,5 mm. *Borneo* 15. *V. filiforme*
- 12.a. Leaves  $\pm$  bullate, with eglandular hairs all over the undersurface, 9—17(—21) by 4—7(—10) cm. *Borneo* . . . . . 16. *V. sulcatum*
- b. Leaves not properly bullate; non-glandular hairs, if any, limited to the midrib and nerves . . . . . 13
- 13.a. Leaves relatively small, 3—5(sometimes in part in the same specimen up to 6,5) by 1—2(—2,3) cm . . . . . 14
- b. Leaves medium-sized to large, (4,2—)6—20(—27) by (1—)2—9 cm . . . . . 17
- 14.a. Pedicels 1,5—2 mm. (Leaves reticulate beneath.) Corolla c. 3 mm. *Borneo* 17. *V. minimiflorum*
- b. Pedicels (2—)3—4 mm. Corolla 4—4,5 mm . . . . . 15
- 15.a. Disk glabrous. Leaves not reticulate beneath. *Celebes* . . . . . 18. *V. henrici*
- b. Disk pubescent. Leaves reticulate beneath . . . . . 16
- 16.a. Calyx densely hairy. *Borneo* . . . . . 19. *V. uroglossum*
- b. Calyx sparsely glandular, epilose. *Borneo* . . . . . 20. *V. tenerellum*
- 17.a. Leaves abruptly protracted at the very base, i.e. distinctly decurrent in the upper part of the petiole for c. 2 mm and instructed there with a thick, protruding gland on each side (the glands seemingly on the petiole itself). *Borneo* 21. *V. bigibbum*
- b. Leaves not protracted at the base resp. not decurrent on the petiole, the two (whether or not protruding) glands on the very margin of the lamina (and mostly in some distance from the petiole) . . . . . 18
- 18.a. Basal glands thick,  $\pm$  projecting from the edge of the lamina in the way of small auricles. (22. *V. acuminatissimum* s. lat.) . . . . . 19
- b. Basal glands minute, or, if larger (i.e. well visible) not or hardly projecting beyond the edge of the lamina, or mostly impressed . . . . . 21
- 19.a. Leaves (sub)ovate-oblong or mostly ovate-lanceolate or -elliptic . . . . . 20
- b. Leaves more elliptic or oblong-elliptic. *Mentawai Isl.* 22. *V. acuminatissimum* f. *ellipticum*
- 20.a. Leaves (1,8—)2,5—4(—4,7) cm wide. *Sumatra, Malay Peninsula, Java* 22. *V. acuminatissimum* f. *acuminatissimum*
- b. Leaves 1,1—2 cm wide. *Sumatra* . . . . . 22. *V. acuminatissimum* f. *marapiense*
- 21.a. Leaves 6—9 cm wide (20—27 cm long). *Borneo* . . . . . 23. *V. piperifolium*
- b. Leaves 1—6 (rarely up to 6,5) cm wide (up to 18 cm long) . . . . . 22

- 22.a. Corolla (3—)4 mm. Style c. 3,5 mm. . . . . 23  
 b. Corolla 2—2,5 mm. Style up to 2,5 mm. . . . . 24  
 23.a. Leaves densely prominently reticulate on both faces. *Borneo* 24. *V. moultonii*  
 b. Leaves reticulate beneath only. *Borneo* . . . . . 25. *V. dipladenium*  
 24.a. Leaves practically not reticulate at full age. (26. *V. leptanthum* s. lat.) . . . . . 25  
 b. Leaves densely reticulate on both faces or at least underneath at full age . . . . . 27  
 25.a. Leaves  $\pm$  lanceolate, the base cuneate. Pedicels very slender, (4—)5—6 mm long  
 at anthesis. *Sumatra, Java, Borneo* . . . . . 26. *V. leptanthum* f. *leptanthum*  
 b. Leaves ovate-elliptic or elliptic, the base broadly attenuate. Pedicels more stoutish,  
 (2—)3—4 mm long at anthesis . . . . . 26  
 26.a. Leaves 4,5—7,5 by 1,6—2,6 cm. *Borneo* . . . . . 26. *V. leptanthum* f. *ellipticum*  
 b. Leaves 6—11 by (2,5—)3—4 cm. *Malay Peninsula*  
 26. *V. leptanthum* f. *malayanum*  
 27.a. Rhachis (very) slender. Pedicels (sub)filiform. Corolla ovoid- or subglobose-urceolate. *Borneo* . . . . . 27. *V. flagellatifolium*  
 b. Rhachis stoutish. Pedicels more robust. Corolla subcylindric-urceolate. *Borneo*  
 28. *V. adenopodum*

7. *V. lanceifolium* (Ridl.) Sleum., Bot. Jahrb. 71, 1940, 168 (*lancifolium*); Masam., En. Phan. Born. 1943, 575. — *Rigiolepis lanceifolia* Ridl., Kew Bull. 1922, 106 (*lancifolia*); J. J. S., Blumea 1, 1935, 330.

BORNEO. Sarawak, near Quop, *Haviland* 619 (K, lectotype; SAR); Mt Start, c. 450 m, *Haviland* 1462 (K, SAR).

8. *V. lobbii* (Ridl.) Sleum., Bot. Jahrb. 71, 1940, 168; Masam., En. Phan. Born. 1943, 575. — *Rigiolepis lobbii* Ridl., Kew Bull. 1922, 107; J. J. S., Blumea 1, 1935, 330.

BORNEO. Sarawak, locality not given, 900 m, *Lobb s.n.* (K, type); Bidi Cave, *Clemens* 20608; *ibid.*, summit of G. Kapor, *Brooks anno* 1908. Kuching, B. Bráang, 550 m, *Anderson* 9125, fl.

9. *V. borneense* W. W. Sm., Not. R. Bot. Gard. Edinb. 8, 1915, 329; Merr., En. Born. 1921, 466. — *Rigiolepis borneensis* Hook. f., Ic. Pl. 12, 1876, 54, t. 1160; Ridl., Kew Bull. 1922, 106; Copel. f., Philip. J. Sc. 47, 1932, 103; J. J. S., Blumea 1, 1935, 325. — *V. acuminatissimum* (non Miq.) Merr., En. Born. 1921, 465.

#### var. *borneense*.

BORNEO. Sarawak, Kuching, *Brooke* 8343; *Beccari* P. B. 575, 753; *Hewitt anno* 1905; *ibid.*, G. Bungoh, summit, 1065 m, *Brunig* 7618. Mt Santubong, 300 m, *Anderson* 231; *Yakup* 6531. Mt Poi, base, *Clemens* 21962 (SAR). Bako Nat. Park, Lintang Path, *Sinclair c.s.* 10323. Mt Mattang, *Haviland* 840 p.p., 1020; *Nat. Coll. (Dabong)* 729, 1503; *Ridley* 12292 p.p. Mt Sengghai, 300 m, *Nat. Coll.* 5143. Undup, *Beccari* P. B. 577. Road to Jankar, *Anderson* 151. Locality not given, *Lobb s.n.* (K, type of *Rigiolepis borneensis*); *Nat. Coll.* 66 (E, type of *V. borneense*; K, SAR), 1160, 1748, 1956; *Beccari* P. B. 161. Western part, Pontianak, Mandor, 50 m, *Mondi* 296; *Polak* 219 (BO, not seen). B. Sinkadjang, *Teysmann* 8149. Landak Ngabang, *Teysmann* 11514, 11555. Between S. (Semitau?) and G. Kenepai, *Hallier* 1488, 1937. G. Klam, *Hallier* 2339. Locality not given, *Jaheri s.n.*

var. *poianum* (J. J. S.) Sleum., nov. stat. — *V. poianum* (J. J. S.) Sleum., Bot. Jahrb. 71, 1940, 168; Masam., En. Phan. Born. 1943, 576. — *Rigiolepis poiana* J. J. S., Blumea 1, 1935, 327, f. 1, a—f.

BORNEO. Sarawak, Mt Poi, 1065—1700 m, *Foxworthy* 395 (PNH, type); *Hewitt s.n.* (K); *Clemens* 6679 (BO, not seen), 20006, 20019 (BO, not seen), 20043,



22589; *Beccari* P.B. 2407; *Bell* 2034; *Purseglove* 4722, 4774. Mt Mattang, near summit, *Haviland* 840 p.p. (SAR); *Clemens* 20992; *Moulton* (Nat. Coll.) 259 (BM); *Ridley* 12292 p.p.; *Hullett* 740; *Hewitt* s.n. Mt Penrissen, *Jacobs* 5092. Lundu, G. Gading, *Sinclair* c.s. 10388. Locality not known, *Nat. Coll.* 731 (A).

10. *V. monanthum* Ridl., Kew Bull. 1922, 108.

BORNEO. Sarawak, Niah, *Haviland & Hose* 3465 (K, type; SAR). Baram Distr., Mt Trekan, c. 610 m, *Hose* 649 (BM, K). Mt Dulit, near Long Kapa, 800 m, *Richards* 2114 (K).

11. *V. uniflorum* J. J. S., Ic. Bog. 4, 1910, 67, t. 320; Merr., En. Born. 1921, 467. — *Rigiolepis uniflora* (J. J. S.) J. J. S., *Blumea* 1, 1935, 330.

BORNEO. Central part, Müller Mts, Amai Ambit, *Hallier* 3296 (BO, type).

12. *V. megaphyllum* Sleum., nom. nov. — *V. macrophyllum* (J. J. S.) Sleum., Bot. Jahrb. 71, 1940, 168; Masam., En. Phan. Born. 1943, 575, non Piper (1908). — *Rigiolepis macrophylla* J. J. S., *Blumea* 1, 1935, 335.

var. *megaphyllum*.

BORNEO. Central part, G. Batu Lesong, *Amdjah* (Exp. Nieuwenhuis) s.n. (BO, type, not seen; L).

var. *adenophorum* Sleum., nov. var. — Folia ovato-oblonga usque lanceolata, nervatura *V. megaphyllo* simillima, sed minora et angustiora, (12—) 14—19 cm longa, 4—6 cm lata, longius et acutius (subcaudato-)acuminata, glandulis duabus basalibus in basi ipsa laminae protracta, id est in apice petioli (ut in *V. bigibbo*) insertis magisque prominulis. Inflorescentia (infructescentia) ut in *V. megalophyllo*.

BORNEO. Western part, Sungei Semitau, upper course of Kapuas R., *Hallier* 1281 (BO, K; L, type; U).

13. *V. capillipes* Sleum., Bot. Jahrb. 71, 1940, 168. — *Rigiolepis salicifolia* J. J. S., *Blumea* 1, 1935, 336, f. 6, a—k. — *V. salicifolium* (J. J. S.) Masam., En. Phan. Born. 1943, 576, nec Steud. (1841).

BORNEO. Central Eastern part, W. Kutei, Mt Kemul, summit at 1800 m, *Endert* 3988 (BO), 4100 (BO), 4425 (A; BO, type; L, SING).

14. *V. kemulense* Sleum., Bot. Jahrb. 71, 1940, 168. — *Rigiolepis endertii* J. J. S., *Blumea* 1, 1935, 339, f. 7, a—f. — *V. endertii* (J. J. S.) Masam., En. Phan. Born. 1943, 574, nec J. J. S. (1935).

BORNEO. Central Eastern part, W. Kutei, Mt Kemul, 1500—1800 m, *Endert* 3883 (BO, type, not seen; L, P), 4479; Mt Palimasan near Tabang on Belagan R., 800 m, *Kostermans* 13089.

15. *V. filiforme* (J. J. S.) Sleum., Bot. Jahrb. 71, 1940, 168; l. c. 71, 1941, 419 in texto; Masam., En. Phan. Born. 1943, 574. — *Rigiolepis filiformis* J. J. S., *Blumea* 1, 1935, 340, f. 8, a—e.

BORNEO. Central Eastern part, W. Kutei, Bolset, 400 m, *Endert* 4041 (A, BM; BO, type, not seen; L, SING).

16. *V. sulcatum* Ridl., Kew Bull. 1922, 107. — *Rigiolepis sulcata* (Ridl.) J. J. S., *Blumea*, 1, 1935, 336.

BORNEO. Sarawak, Sungei Mohon near Kuching, *Beccari* P.B. 3580 (cit. '3780', FI; K, lectotype). Niah, *Haviland & Hose* 3466 A (cit. 3466, K, syntype; SAR). Bt. Buan, Tatau, 60 m, *Purseglove* 5484. Near Kuching, *Haviland* 1625 (K, syntype).

17. *V. minimiflorum* Sleum., Bot. Jahrb. 71, 1940, 162.

BORNEO. Sarawak, Mt Dulit, Ulu Koyan, c. 1000 m, *Richards 2103* (K, type).

18. *V. henrici* Sleum., Bot. Jahrb. 71, 1940, 161.

CELEBES. Southern part, Lombasang, 1100 m, *Heinrich 68* (B, type, †; L, fragm. (fol.) ex B).

19. *V. uroglossum* Sleum., Bot. Jahrb. 71, 1940, 166.

BORNEO. Northern part, Mt Kinabalu, 1525—1830 m, *Clemens 10335* (A), 28587, 29013, 29071 (BM), 29851, 29854 (B; BM, type; BO, G, K, L, NY), 30076, 40802, 40889.

20. *V. tenerellum* Sleum., nov. spec. — Frutex humilis, scandens. Ramuli gracillimi, in partibus subteretibus novellis dense brevissime pubescentes, laxe foliati. Folia ovato-lanceolata, apice per 1,5—2,5 cm longe sat anguste subcurvato-caudato-acuminata, subacuta, basi  $\pm$  rotundata, subcoriacea, subtus laxe appresse glanduloso-muriculata, ceterum in facie glabra, utrinque nitidula, integra, in sicco supra paullo convexa, inferne parum revoluta, 4—6 cm longa, 1,5—2,3 cm lata, costa supra in sulco prominula et inferne laxissime appresse pilosula, subtus prominente, nervis basalibus et parum suprabasalibus utroque latere 2(—3), extimis minus distinctis, omnibus curvatis atque ascendentibus, supra sicut costa parum elevatis, subtus minus conspicuis, nervis aliis superioribus brevioribus seu venis irregularibus nonnullis, cum rete venarum venularumque denso utrinque prominulis; petioli vix 2 mm longi, pubescentes; perulae gemmarum steriliū axillarium subulatae, 2—3 mm longae. Racemi ex axillis superioribus orti, solitarii, laxe 8—12-flori; rhachis sub anthesi gracillima, sicut pedicelli pilis brevibus albidis patentibus glandulisque paucis graciliter stipitatis brunneis intermixtis instructa, 3—5 cm longa. Pedicelli gracillimi, sub anthesi 3—4 mm longi, basi bractea oblongo-acuminata c. 1,5 mm longa suffulti, ad medium vel altius bibracteolati. Calycis tubus breviter cylindricus, basi truncatus, leviter 5-angulatus, laxe glanduloso-muriculatus, epilosus, c. 0,8 mm longus; lobi ovato-triangulares, dorso subglabri, ciliolati et ad marginem glandulis crassis substipitatis pluribus brunneis ornati, c. 1 mm longi. Corolla urceolata, fauce valde contracta, tenera, glabra vel laxe pilis glanduloso-muriculatis adspersa, c. 4 mm longa, c. 2,5 mm diam., lobis reflexis obtusis c. 0,4 mm longis. Stamina 10, c. 2,9 mm longa; filamenta linearia, pilosa, 1,8 mm longa; thecae subovato-oblongae, 0,8 mm longi, dorso calcaribus patentibus curvatis 0,8 mm longis instructae; tubuli angusti, 1 mm longi. Discus pilosus. Stylus gracilis, glaber, c. 3,8 mm longus. Bacca immatura subglobosa, apice truncata, c. 3 mm diam., rhachi pedicellisque quam florendi tempore crassioribus.

BORNEO. Sarawak, Marigan Ra., 1220 m., *Brunig s.n.* Brunei, G. Pagon ridge, 1525 m, *Ashton BRUN 2300* (K; L, type), in moss forest on sandstone and shale ridge, fl. April 1958; *ibid.*, 1860 m, *Ashton BRUN 2404* (K, L), fr. imm.; *ibid.*, summit of Pagon Priok, *Ashton BRUN 2387* (L), on rugged exposed knife edge sandstone ridge.

21. *V. bigibbum* J. J. S., Bull. Jard. Bot. Btzig III, 1, 1918, 408, t. 55. — *Rigiolepis bigibba* (J. J. S.) J. J. S., Blumea 1, 1935, 336.

BORNEO. Western part, Landak, P. Pandjang, *Teysmann 7966* (BO, lectotype, not seen; FI, L). Kapuas, *Teysmann 7970*. No locality given, *Jaheri s.n.* Sarawak, Gat, Upper Rejang R., *Clemens 21697*. Central part, Sungei Semitau, *Hallier 1281 b* (BO, not seen). Sungei Blu-u, *Jaheri* (Exp. Nieuwenhuis) 425 (BO, not seen). Brunei, Kuala Temburong Machang, 550 m, *Asah BRUN 3133*, on clay ridge.



22. *V. acuminatissimum* Miq., Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 36; Ridl., J. Str. Br. R. As. Soc. 33, 1900, 103; K. & G., J. As. Soc. Beng. 74, ii, 1905, 66; Ridl., Fl. Mal. Pen. 2, 1923, 210; Burk. & Henders., Gard. Bull. Str. S. 3, 1925, 390; Amsh. in Back., Bekn. Fl. Java (em. ed.) 7, 1948, fam. 163, p. 2. — (Gay) *Lussacia lanceolata* Bl., Bijdr. 1826, 861; Dun. in DC., Prodr. 7, 1839, 557; Hassk., Cat. Hort. Bot. Bog. 1844, 160; Miq., Fl. Ind. Bat. 2, 1859, 1063. — *Agapetes lanceolata* (Bl.) Niedenzu, Bot. Jahrb. 11, 1889, 201 in clavi, 246. — *Agapetes acuminatissima* (Miq.) Niedenzu, l. c. 201, 224, 247. — *Adnaria lanceolata* (Bl.) O. Ktze, Rev. Gen. Pl. 2, 1891, 383. — *V. lanceolatum* (Bl.) J. J. S., Ic. Bog. 3, 1910, 68; Koord.-Schum., Syst. Verz. 1912, fam. 233, p. 109; J. J. S. in K. & V., Bijdr. 13, 1914, 144; Koord., Exk. Fl. Java 3, 1912, 12; de Voogd, Trop. Natuur 23, 1934, 83 in text, nec Dunal (1839). — *Rigiolepis lanceolata* (Bl.) J. J. S., Blumea 1, 1935, 330.

f. *acuminatissimum*. — *V. acuminatissimum* Miq. f. *javanicum* Miq. et f. *sumatranum* Miq., Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 36. — *Thibaudia singalensis* Korth. ex Boerl., Handl. 2 (1), 1891, 263, in syn. — *V. acuminatissimum* Miq. var. *singalense* J. J. S. in K. & V., Bijdr. 13, 1914, 145, in texto. — *Rigiolepis lanceolata* (Bl.) J. J. S. f. *sumatrana* (Miq.) J. J. S., Blumea 1, 1935, 331, f. 2, a—f. — *V. lanceolatum* (Bl.) J. J. S. f. *sumatranum* (Miq.) Sleum., Bot. Jahrb. 71, 1940, 168.

SUMATRA. Westcoast, G. Tandike and G. Singgalang, *Korthals s.n.* (L, type of *V. acuminatissimum* f. *sumatranum* and var. *singalense*). Padang, Ajer Mantjur, 360 m, *Beccari P. B.* 516. G. Kerintji, 1400 m, *Meijer 6658*; between Kaju Arau and Bt. Sipatai, 1000 m, *Van Borssum Waalkes 2881*. Benkulen, Liwa, 800 m, *De Voogd 1229*. Suban Ajam, *Ajoeb 353* (BO, not seen). Lebong, Pasir Lebar, Beriti, 1000 m, *De Voogd 1126*. Lebong Tandai, *Brooks 7361*.

MALAY PENINSULA. Perak, Bikam For. Res., *For. Dep. F. M. S.* 24839 *Watson*. Larut, *Kunstler 3509, 6734, 7810*. Japa, *Wray 1159, 1418, 2821*. Locality not given, *Wray 2821*; *Scortechini 472*. Singapore, Bt. Mandai, *Ridley 6235 p.p.* (K); *Herb. Wallich 7528* (K).

JAVA. Djakarta/Preanger, G. Salak, 700—900 m, *Blume 2045* (L, type of *Gaylussacia lanceolata* (*Munnicksia lanceolata* Bl. msc.) and *V. acuminatissimum* f. *javanicum*); *ibid.*, *Reinwardt s.n.*; *Zippelius s.n.*; *Lam 3790*; *ibid.*, near Bobodjong, 700 m, *Koorders 24469*.

f. *marapiense* (J. J. S.) Sleum., nov. comb. — *Rigiolepis lanceolata* (Bl.) J. J. S. f. *marapiensis* J. J. S., Blumea 1, 1935, 332, f. 3, a—g. — *V. lanceolatum* (Bl.) J. J. S. f. *marapiense* (J. J. S.) Sleum., Bot. Jahrb. 71, 1940, 168.

SUMATRA. Westcoast, G. Merapi, 1100—1200 m, *Bünnemeijer 4668, 5010* (BM; BO, type, not seen; L).

Note: In general, the Javanese specimens have more lanceolate and narrower, the Sumatran and Malay Peninsular ones more ovate-lanceolate and broader leaves; the flowers of the latter seem to be very slightly larger. These differences are not significant enough to distinguish proper forms systematically, the more as among the Sumatran material also narrower leaves occur. More distinct from the bulk of the Sumatran material is a special form found on Mt Merapi, and another from the Mentawai Islands and Simalur.

f. *ellipticum* (J. J. S.) Sleum., nov. comb. — *V. acuminatissimum* (non Miq. s. str.) Ridl., Kew Bull. 1926, 71. — *Rigiolepis lanceolata* (Bl.) J. J. S. f. *elliptica* J. J. S., Blumea 1, 1935, 333, f. 4, a—k. — *V. lanceolatum* (Bl.) J. J. S. f. *ellipticum* (J. J. S.) Sleum., Bot. Jahrb. 71, 1940, 168.

SUMATRA. Simalur, Achmad 529 (BO, type; K, L, SING, U). Mentawai Isl., Sipora, Iboet 538; B. Kloss 14809.

23. **V. piperifolium** Sleum., nov. sp. — Frutex epiphyticus c. 3 m altus. Ramuli apicibus obtusanguli, c. 2 mm diam., sub lente brevissime pubescentes vel puberuli pilisque clavatis glandulosis minimis aspersi, ad partes vetustiores glabrescentes 4—5 mm diam. laxe lenticellis elliptico-subrotundatis veruciformibus induti, denique albido-cinereo-corticati. Folia sparsa, pro genere permagna, elliptico-oblonga, apice breviter (2—3 cm) subcaudato- vel subcuspidato-acuminata, acutiuscula, basi late attenuata, glandulis basalibus 2 sat magnis haud prorumpentibus petiolo approximatis instructa, coriacea, ad partem basalem costae puberula, ceterum omnino glabra, subtus laxissime vel haud punctata, utrinque  $\pm$  nitentia, integra, 20—27 cm longa, 6—9 cm lata, medio latissima, in margine ipso brevissime revoluta, e basi et paullo supra basin 7-plinervia, costa nervisque interioribus aequaliter supra sulcatis, sed in sulco ipso prominentibus, subtus bene prominentibus, nervorum pare exteriore utrinque multo minus distincto, nervis ceteris altius a costa abeuntibus pinnatis,  $\pm$  irregularibus numerosioribus, supra leviter impressis, subtus parum elevatis, venis venulisque rete densum utrinque aequaliter prominulum formantibus; petioli rugosuli, glabri, 5—6 mm longi, c. 2 mm diam. Racemi axillares solitarii, laxe c. 10-flori, basi perulis pluribus subulatis acutissimis 4—6 mm longis (etiam in axillis sterilibus obvis) instructi, corolla excepta in omnibus partibus puberuli et minutissime glandulosi; rhachis gracilis, 4—6 cm longa; bractee ovato-acuminatae, 1,5—2 mm longae. Pedicelli subgraciles, 2—3 mm longi,  $\pm$  sub medio minute bibracteolati. Calyx parce glandulosus, vix pilosus, tubo semigloboso c. 0,5 mm alto, lobis ovato-acuminatis, subacutis, c. 1 mm longis. Corolla ovoideo-urceolata, tenera, alba?, c. 3 mm longa, extus laxe pilis glandulosis brevibus muriculatis aspersa, pilosa. Stamina 10, c. 2,2 mm longa; filamenta longe pilosa, 0,5 mm longa. Antherae cum tubulis 1,5 mm longae, thecis late oblongis papillois c. 0,7 mm longis, dorso biaristatis (0,3 mm), tubulis 0,7 mm longis. Ovarii caput et discus laxe breviter pubescens. Stylus glaber, 2,5 mm longus.

BORNEO. Sarawak, Gat, Upper Rejang R., Clemens 21696 (A, BM, BO, K; L, type; SAR).

24. **V. moultonii** Merr., J. Str. Br. R. As. Soc. 87, 1923, 22. — *Rigiolepis moultonii* (Merr.) J. J. S., Blumea 1, 1935, 336.

BORNEO. Sarawak, Upper Baram R., G. Temabo (Lemabok), 1220 m, Moulton SF 6676 (BO, K; SING, type). Sibuloba Kabang, KEP 79331 Wyatt-Smith, in *Shorea albida* padang, fr. Mt Dulit, c. 1200 m, Synge 411. North Borneo, mile 24, Apas road, Tawau, Meijer SAN 19433.

25. **V. dipladenium** Sleum., Bot. Jahrb. 71, 1940, 168. — *V. acuminatissimum* Miq. f. *borneense* Miq., Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 36. — *Rigiolepis korthalsii* J. J. S., Blumea 1, 1935, 334, f. 5, a—f. — *V. korthalsii* (J. J. S.) Masam., En. Phan. Born. 1943, 575, nec Miq. (1863).

BORNEO. Southern part, G. Sakumbang, SE of Bandjermasin, Korthals s.n. (K; L, type of *V. acuminatissimum* f. *borneense*, 'Munnicksia lanceolata' Bl. var. *latifolia* Bl. msc.).

26. **V. leptanthum** Miq., Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 37; Koord., Exk. Fl. Java 3, 1912, 12; J. J. S. in K. & V., Bijdr. 13, 1914, 146; Sp. Moore,



J. Bot. 63, 1925, Suppl. 55; Amsh. in Back., Bekn. Fl. Java (em. ed.) 7, 1948, fam. 163, p. 2. — *Agapetes leptantha* (Miq.) Niedenzu, Bot. Jahrb. 11, 1889, 201, in clavi. — *V. acuminatissimum* Miq. f. *leptanthum* (Miq.) Vuyck in Boerl., Handl. 2 (1), 1891, 263 (*leptantha*). — *Rigiolepis leptantha* (Miq.) J. J. S., Blumea 1, 1935, 338.

**f. leptanthum.**

SUMATRA. Southern part, W. Palembang, S. Karangnata, near Muara Mengkulem, 120 m, *Forbes 3129*; *ibid.*, Napallitjin, 700 m, *Forbes 3129*. Locality not given (probably from Westcoast, G. Malintang), *Korthals s.n.* (L, syntype).

MALAY PENINSULA. Johore, S. Kayu, *Kiah SF 32045, 32062*. S. Sedili, *Corner SF 25998*.

LINGGA ARCHIPEL. P. Sebangka, S. Semarong, 10 m, *Bünnemeijer 7517*. P. Lingga, *Teysmann s.n.*

JAVA. Preanger, Papandayan, *Korthals s.n.* (L, lectotype). Nangèla, SW of Leuwiliang, 400—450 m, *Docters van Leeuwen 12040*; *Van Steenis 2771*. Locality not given, *Zollinger 3034*.

BORNEO. Sarawak, Gading, *Beccari P.B. 2316*. N of Bintulu R., *Beccari P.B. 4053*. Lundu, *Beccari P.B. 2353*. Kuching, *Haviland 984*. Kelepaan, *Brooke 8852*. Mt Bráang, 150 m, *Haviland 752*. Bau, 30 m, *Purseglove 4445*. Mt Poi, 610 m, *Purseglove & Shah 4814*. Near Bt. Tambi, Bako National Park, 120 m, *Purseglove 5615*. Bt. Daya, Bau, 120 m, *Anderson 8443*. Brunei, Kuala Belalong, Temburong, *Ashton BRUN 471* (with more elongate leaves, not typical).

**f. ellipticum** (J. J. S.) Sleum., Bot. Jahrb. 71, 1940, 168. — *Rigiolepis leptantha* (Miq.) J. J. S. f. *elliptica* J. J. S., Blumea 1, 1935, 338. — *V. leptanthum* Miq. var. *ellipticum* (J. J. S.) Masam., En. Phan. Born. 1943, 575.

BORNEO. Western part, G. Semedum, *Hallier 711* (BO, lectotype, not seen; L). Sarawak, Mt Mattang, *Haviland 1758*; *Beccari P.B. 592, 1748*. Near Quop, *Haviland 808 p.p.* (K).

**f. malayanum** Sleum., nov. form. — Folia ovato-elliptica usque elliptica, 6—11 cm longa, (2,5—)3—4 cm lata. Pedicelli sat robusti, sub anthesi (2—)3—4 mm longi.

MALAY PENINSULA. Pahang, Ulu Tembeling, *Henderson SF 21953* (BM, BO, BRI; K, type; KEP, SING). Trengganu, Ulu Brang, c. 100 m, *Moysey & Kiah SF 33313, 33652*. Kelantan, S. Galas at Gua Musang, *Henderson SF 22635*.

27. **V. flagellatifolium** Copel. f., Philip. J. Sc. 42, 1930, 567. — *V. caudatifolium* Merr., J. Str. Br. R. As. Soc. 76, 1917, 103; En. Born. 1921, 466, non Hayata (1913). — *Rigiolepis caudatifolia* "(Merr.)" J. J. S., Blumea 1, 1935, 340. — *V. myrianthum* Sleum., Bot. Jahrb. 71, 1940, 162.

BORNEO. Sarawak, Liu Matu, Baram R., *Moulton 43* (= *B.S. 2792*). Near Quop, *Haviland 808 p.p.* Bidi Cave, *Clemens 20689*. Mt Dulit trail, 300—400 m, *Richards 1384, 1461* (K, type of *V. myrianthum*; L), 2282. Locality not given, *Nat. Coll. 1679* (K, type of *V. caudatifolium*). Western part, near Danau Pentulak, *Main* (Exp. Polak) 1927 (with larger leaves). Eastern part, Mt Medadem, N of Sangkulirang, 150 m, *Kostermans 13330* (disk pubescent).

28. **V. adenopodium** Sleum., nov. sp. — Frutex. Ramuli teretes crebre suborbiculato-lenticellati, in partibus novellis puberuli. Folia lanceolata, apice per 1,5—2 cm caudato-acuminata, acuta, basi latius vel angustius in petiolum cuneata haud protracta, glandulis basalibus distinctis sed parum vel vix prominulis, coriacea, nitida, glabra, subtus laxe minute nigrescenti-punctulata, integra, in sicco margine parum revoluta, 10—15 cm longa, 3—4 cm lata,

in medio latissima, 5(—7)-plinervia, nervis e basi et parum (usque ad 1,5 cm) supra basin ortis, cum costa supra in sicco  $\pm$  impressis, subtus prominulis, nervis lateralibus vel venis a superiore costae parte pinnatim abeuntibus parum conspicuis, rete venularum supra laxo, subtus densiore utrinque prominulo; petioli transverse rugosuli, 5—6(—7) mm longi, c. 1 mm crassi. Perulae gemmarum axillarium sterilius subulatae, 2—3 mm longae. Racemi ex axillis foliatis et defoliatis orti, suberecti, e basi dense 12—15(—20)-flori, 2—3,5 cm tantum longi, ubique corolla excepta subdense brevissime brunneo-pubescentes et -glandulosi; rhachis sat robusta, basi fere 1 mm diam. ibique perulis subulatis pluribus 2—3 mm longis suffulta. Pedicelli sat robusti, (2—)3—4 mm longi, basi bractea ovato-acuminata c. 2 mm longa,  $\pm$  in medio bracteolis 2 subulatis 1—1,5 mm longis cito caducis instructi. Calycis tubus sub anthesi campanulatus c. 0,7 mm longus, lobis anguste ovato-acuminatis c. 1 mm longis, glandula minuta apiculatis. Corolla subcylindrico-urceolata, leviter 5-angulata, extus ad angulos levissime pubescens, ceterum glabra, ex coll. flavida, 2 mm longa, c. 1,5 mm diam., breviter 5-loba. Stamina 8; filamenta linearia, subdense pilosa, 1 mm longa; thecae 0,3—0,4 mm longae, breviter dorso bicalcaratae; tubuli erecti, c. 0,5 mm longi, rima introrsa elongata scissi. Stylus gracilis, glaber, c. 2,5 mm longus. Ovarii caput (intra discum) subdense pilosum, disco circumdante ipso glabro.

BORNEO. Western part, P. Sepandan, D. Luar, Kapuas Lakes, fl. fr. imm. 8-10-1949, *Main* (Exp. Polak) 1992 (BO; L, type).

4. Sect. **Oarianthe** Schltr, Bot. Jahrb. 55, 1918, 169; Copel. f., Philip. J. Sc. 42 (4), 1930, 599; Sleum., Bot. Jahrb. 71, 1941, 418; l. c. 72 (2), 1942, 221.

Type species: *V. finisterrae* Schltr.

Note: From sect. *Nesococcus*, with its several- to many-flowered racemes, sect. *Oarianthe* is only distinct by its single-flowered inflorescences. Such an axillary solitary flower, to judge from the number and the position of the bracts, must be regarded here as the last step of reduction, and the distinction between the two sections thus becomes artificial, resp. a mere matter of practice. There are several spp. which show two-flowered inflorescences and solitary axillary flowers in the same specimen, such as *V. tomicipes* in Celebes, and *V. leptocladum* in Borneo, but in that case the single flower or the two flowers are on top of a distinct peduncle, and it is for that reason, that these spp. are placed in sect. *Nesococcus*, whilst all spp. with a very short (1 mm, rarely up to 2 mm) or practically absent peduncle constitute the sect. *Oarianthe*.

Apart from *V. microphyllum* (Philippines, Moluccas and New Hebrides), *V. whitfordii* in the Philippines, *V. ceramense* in Ceram, *V. whiteanum* in the Solomon Islands and *V. whitmeei* in Samoa, the section is restricted to New Guinea.

### Key to the species

- 1.a. Leaves entire or with 1 (rarely 2 or 3, very rarely 4) depressed marginal glands irregularly set on each side, not properly regularly crenate or crenulate . . . 2
- b. Leaves distinctly and regularly (equidistantly) crenate or subserrate-crenulate over the whole margin or at least in its upper half . . . . . 51
- 2.a. Corolla villous all over outside . . . . . 3
- b. Corolla laxly (and only partly) hispidulous- or glandular-hairy, or muriculate, or mostly glabrous outside (the lobes sometimes ciliate) . . . . . 4



- 3.a. Leaves elliptic to subovate-elliptic, apex very broadly attenuate and obtuse, base  $\pm$  rounded. Corolla c. 9 by 4 mm. *New Guinea* . . . . . 29. *V. villosiflorum*  
 b. Leaves ovate, obtusely acuminate towards the apex, broadly attenuate to rounded at the base. Corolla 6—7 by 3 mm. *New Guinea* . . . . . 30. *V. pilosiflorum*
- 4.a. Flowers sessile or nearly so, i. e. pedicel plus peduncle, if any, rarely amounting to a total of 2, very rarely 3 mm at anthesis . . . . . 5  
 b. Flowers distinctly (generally at least 3 mm) pedicellate (plus pedunculate) . . . . . 16
- 5.a. Calyx quite glabrous dorsally . . . . . 6  
 b. Calyx  $\pm$  densely hairy or hirsutulous dorsally . . . . . 13
- 6.a. Leaves elliptic to ovate- or oblong-elliptic, base broadly attenuate to rounded . . . . . 7  
 b. Leaves  $\pm$  obovate, base short- or long-cuneate . . . . . 9
- 7.a. Leaves 0,8—1,5(—2) by 0,5—0,8(—1) cm. *New Guinea* . . . . . 31. *V. finisterrae*  
 b. Leaves 0,4—0,8(—1) by 0,3—0,5 cm . . . . . 8
- 8.a. Disk glabrous. *New Guinea*. A form with subentire leaves of  
 70. *V. amblyandrum* var. *amblyandrum*  
 b. Disk hairy. *New Guinea* . . . . . 49. *V. bodenii*
- 9.a. Leaves 0,6—1,4 cm wide . . . . . 10  
 b. Leaves 0,3—0,6(—0,7) cm wide . . . . . 11
- 10.a. Leaves 1,4—3 by 0,7—1,4 cm. Corolla depressedly subglobose-urceolate, i. e. much constricted apically, c. 5 by 4—5 mm. *New Guinea* . . . . . 68. *V. pullei*  
 b. Leaves 1—1,5 by 0,6—0,9(—1) cm. Corolla subcylindric-urceolate, c. 7 by 3 mm. *New Guinea* . . . . . 32. *V. brachycladum*
- 11.a. Leaves narrow-obovate, base  $\pm$  long-cuneate, 1—1,4 by 0,4—0,5 cm. *New Guinea* . . . . . 33. *V. hatamense*  
 b. Leaves obovate, sometimes suborbicular-obovate, base short-cuneate, (0,4—)0,5—1 by 0,3—0,6(rarely up to 0,7) cm . . . . . 12
- 12.a. Style glabrous. Filaments glabrous or very sparsely hairy. Calyx rugulose. *New Guinea* . . . . . 34. *V. parvulifolium*  
 b. Style densely subappressedly hairy to the lower  $\frac{2}{3}$ . Filaments subdensely hairy below. Calyx smooth. *New Guinea* . . . . . 35. *V. scyphocalyx*
- 13.a. Corolla depressedly ovoid- or subglobose-urceolate . . . . . 14  
 b. Corolla narrowly ovoid- or subconical-urceolate (at least 5 mm) . . . . . 15
- 14.a. Corolla 3,5 by 3 mm. Leaves elliptic or oblong-obovate to obovate, (0,7—)1—2,1 by (0,6—)0,8—1 cm. *New Guinea* . . . . . 36. *V. versteegii*  
 b. Corolla c. 8 by 6 mm. Leaves ovate to elliptic-ovate, (0,8—)0,9—1,2(—1,3) by (0,5—)0,6—0,8 cm. *New Guinea* . . . . . 45. *V. culminiculum*
- 15.a. Corolla narrowly ovoid-urceolate, 5—6 mm. Leaves obovate to elliptic-obovate, 0,8—1,3 by (0,3—)0,4—0,7 cm. *New Guinea* . . . . . 37. *V. myrsinoides*  
 b. Corolla narrowly ovoid-conical, 7—8(—9) mm. Leaves obovate, 0,7—1 by 0,5—0,7 cm. *New Guinea* . . . . . 38. *V. convexifolium*
- 16.a. Leaves widest at or below the middle, i. e. never distinctly obovate . . . . . 17  
 b. Leaves widest above the middle, i. e. properly obovate or at least oblong-obovate . . . . . 42
- 17.a. Anthers (thecae plus tubules) markedly longer than the filaments (which are glabrous) . . . . . 18  
 b. Anthers (thecae plus tubules) rarely as long as, mostly shorter than the filaments (which are hairy or at least sparsely so at the base, except in 60. *V. microphyllum*) . . . . . 19
- 18.a. Leaves ovate to ovate-elliptic, base subtruncate-rounded, 4—7(—9) by 3—5(rarely up to 7) mm. Corolla 6—7 mm. *New Guinea* . . . . . 39. *V. densifolium*  
 b. Leaves elliptic, base attenuate into the petiole, 5—8 by 3—4 mm. Corolla 4 mm. *New Guinea* . . . . . 40. *V. sparsicapillum*
- 19.a. Calyx (tube and lobes) dorsally puberulous or mostly  $\pm$  densely hairy or almost hispidulous at least at anthesis (sometimes  $\pm$  glabrescent in fruiting stage) . . . . . 20  
 b. Calyx (tube and lobes) dorsally glabrous (the lobes sometimes ciliate or fimbriate or with an apical tuft of hairs) . . . . . 26
- 20.a. Leaves narrow-oblong, (0,9—1,8 by 0,2—0,4 cm). *New Guinea* . . . . . 41. *V. taxifolium*  
 b. Leaves ovate to elliptic or sometimes oblong or subobovate-elliptic . . . . . 21
- 21.a. Leaves 2,5—4,3 by 0,8—1,8 cm . . . . . 22  
 b. Leaves up to 2 by 1 cm . . . . . 23
- 22.a. Leaves oblong-elliptic, 2,5—3 by 0,8—1 cm. Corolla ovoid-urceolate, 5(—6) by  $\pm$  3 mm. *New Guinea* . . . . . 42. *V. wondiwoiense*

- b. Leaves elliptic or ovate-lanceolate, 2,5—4,3 by 1—1,8 cm. Corolla subglobular-urceolate, c. 7 by 5 mm. *New Guinea* . . . . . 43. *V. schultzei*
- 23.a. Leaves prominently veined beneath (ovate to ovate-elliptic, rarely elliptic (0,7—) 1—2 by (0,4—)0,5—0,9(—1) cm). *New Guinea* 44. *V. cyclopense* f. *cyclopense*
- b. Leaves not or hardly veined beneath . . . . . 24
- 24.a. Leaves ovate to elliptic-ovate, base rounded or mostly subcordate (0,8—1,3 by (0,5—)0,6—0,8 cm). Pedicels 2—3 mm. *New Guinea* . . . . . 45. *V. culminicolum*
- b. Leaves elliptic or subovate- or subobovate-elliptic, base rounded to broadly attenuate or cuneate. Pedicels 5—8(—9) mm . . . . . 25
- 25.a. Leaves 1—1,5(—2) by 0,6—0,8(—1) cm, the edge thickened and much revolute. *New Guinea* . . . . . 59. *V. oranjense* var. *marginellum*
- b. Leaves 0,5—1 by 0,3—0,5 cm, the edge not thickened, slightly revolute below or mostly quite flat. *New Guinea* . . . . . 46. *V. urnigerum*
- 26.a. Leaves (narrow-)lanceolate to subelliptic- or oblong-lanceolate, or narrow-oblong
- b. Leaves ovate to elliptic, sometimes oblong-elliptic or oblong-ovate . . . . . 27
- 27.a. Leaves obtuse at the apex (0,7—1(—1,2) by 0,2—0,3 cm). *New Guinea* . . . . . 47. *V. piceifolium*
- b. Leaves subacute at the apex . . . . . 28
- 28.a. Leaves 0,7—1 by  $\pm$  0,3 cm. Pedicel 3—4 mm. *New Guinea*. A form with subentire leaves of . . . . . 73. *V. prostratum*
- b. Leaves 0,6—1,1 by  $\pm$  0,2 cm. Pedicel 5—6(—7) mm. *New Guinea* . . . . . 48. *V. pugionifolium*
- 29.a. Disk  $\pm$  densely, rarely more laxly set with long  $\pm$  erect hairs . . . . . 30
- b. Disk quite glabrous . . . . . 34
- 30.a. Pedicels (2—)3 mm. (Leaves ovate-elliptic to elliptic, 0,6—1 by (0,3—)0,4—0,5 cm.) *New Guinea* . . . . . 49. *V. bodenii*
- b. Pedicels at least 4 mm . . . . . 31
- 31.a. Leaves 4—6,3 by 1,5—2,5 cm (ovate-elliptic or elliptic). *New Guinea* . . . . . 50. *V. absconditum*
- b. Leaves up to 1,8 by 0,8 cm (elliptic or oblong-elliptic) . . . . . 32
- 32.a. Leaves 0,7—1 by 0,4(—0,5) cm. Corolla c. 5 mm. *Ceram* 51. *V. ceramense*
- b. Leaves 0,8—1,5(—1,8) by 0,4—0,6(—0,8) cm. Corolla 6—7 mm . . . . . 33
- 33.a. Branchlets angular. Corolla urceolate, 6—7 by 3—4 mm. *Solomon Isl.* . . . . . 52. *V. whiteanum*
- b. Branchlets terete. Corolla ovoid-urceolate, 7—8 by c. 7 mm. *New Guinea* . . . . . 53. *V. igneum*
- 34.a. Style hairy at least in the lower half. (Leaves elliptic to narrow- or oblong-elliptic, 0,7—1,3(—1,4) by (0,3—)0,4—0,6(—0,7) cm. Corolla 6—7 mm.) *New Guinea* . . . . . 54. *V. sororium*
- b. Style quite glabrous . . . . . 35
- 35.a. Style  $\pm$  half as long as the corolla. Pedicel with a distinct collarette of numerous thick, subglobular, sessile glands just below the calyx. *Samoa* 55. *V. whitmeei*
- b. Style  $\pm$  as long as the corolla. Pedicel without a collarette of glands as above (but possible with a few stalked glands just below the calyx) . . . . . 36
- 36.a. Leaves 2,5—4,3 by 1—1,8 cm (elliptic or ovate-elliptic). *New Guinea* . . . . . 43. *V. schultzei*
- b. Leaves up to 2 by 1,2 cm . . . . . 37
- 37.a. Leaves 4—6(—7) by 3—4 mm (ovate to elliptic, sometimes oblong-ovate or -elliptic). *New Guinea* . . . . . 56. *V. decumbens*
- b. Leaves all or at least for their greater number in the same specimen exceeding 6 by 4 mm . . . . . 38
- 38.a. Leaves (0,6—)0,7—1(rarely and but partly up to 1,2) by (0,3—)0,4—0,5 cm 39
- b. Leaves larger in general or at least for their greater number in the same specimen, (0,6—)0,8—2,2 by (0,4—)0,6—1(—1,2) cm . . . . . 40
- 39.a. Leaves stiff-coriaceous. Corolla and calyx glandular-muriculate outside. *New Guinea* . . . . . 57. *V. crassiflorum*
- b. Leaves coriaceous to subcoriaceous, less stiff. Corolla and calyx practically glabrous outside. *New Guinea* . . . . . 58. *V. oreomyrtus*
- 40.a. Leaves coriaceous and  $\pm$  stiff, the edge markedly revolute, veins and veinlets obscure. (Corolla ventricose-urceolate, (6—)7—9(—10) mm long, 5—6 mm diam. below, 3—4 mm diam. distally; filaments laxly long-hairy below). *New Guinea* . . . . . 59. *V. oranjense* var. *oranjense*



- b. Leaves chartaceous to subcoriaceous, the edge flat or but slightly revolute, veins and veinlets generally visibly raised beneath . . . . . 41
- 41.a. Pedicels slender. Corolla subglobose-urceolate, the apex much contracted, 4—5(—6) by 3—4 mm below, resp. 1,5—2 mm distally; filaments glabrous or practically so. *Philippines, Moluccas, New Hebrides* . . . . . 60. *V. microphyllum*
- b. Pedicels rather stoutish. Corolla subglobose-urceolate, 6—8(—9) by 5 (sometimes up to 7) mm; filaments (very) laxly hairy below. *New Guinea* . . . . . 44. *V. cyclopense* f. *glabrum*
- 42.a. Leaves with (1—)2—3(rarely up to 4)  $\pm$  deeply sunk marginal glands on each side, and thus seemingly remotely crenulate, the glands distributed over  $\pm$  the whole length of the margin (if 1 gland only, then found  $\pm$  in the middle of the margin, not near the petiole), (0,4—)0,6—1,2 by 0,2—0,4(—0,5) cm. Calyx and disk glabrous. Pedicels glabrous or laxly hairy. *New Guinea* . . . . . 61. *V. globosum*
- b. Leaves with 1 (rarely 2) pair(s) of  $\pm$  basal, much less or not impressed marginal glands (which occur generally within the section, but are sometimes minute and hardly visible), found near to or in a (rather) short distance from the petiole (never occurring in the middle or in the upper half of the margin) . . . . . 43
- 43.a. Calyx  $\pm$  densely short-hairy or subhirsute dorsally . . . . . 44
- b. Calyx (and disk) glabrous . . . . . 46
- 44.a. Disk glabrous. Pedicels hairy. *New Guinea* . . . . . 67. *V. lorentzii* f. *puberulum*
- b. Disk hairy. Pedicels glabrous or practically so . . . . . 45
- 45.a. Leaves 0,8—1,5(—1,8) by 0,3—0,5 (rarely up to 0,6) cm. *New Guinea* . . . . . 62. *V. leptospermoides* f. *leptospermoides*
- b. Leaves 1—2 by 0,7—1(—1,3) cm. *New Guinea* . . . . . 63. *V. vonroemeri*
- 46.a. Pedicels hairy. (Filaments barbate or nearly villous in the middle. Corolla glabrous inside, c. 4 by 3 mm.) *New Guinea* . . . . . 64. *V. barbatum*
- b. Pedicels glabrous (or very laxly glandular-muriculate. Corolla pubescent inside.) . . . . . 47
- 47.a. Filaments quite glabrous. (Peduncle plus pedicel 8—10 mm.) *New Guinea* . . . . . 65. *V. inconspicuum*
- b. Filaments laxly to densely hairy . . . . . 48
- 48.a. Leaves 0,8—1,5(—1,8) by 0,3—0,5 (rarely up to 0,6) cm . . . . . 49
- b. Leaves (1,2—)1,4—3(—3,8) by 0,7—1,3(—1,6) cm . . . . . 50
- 49.a. Branchlets puberulous. Pedicels slender, 6—8 mm. *New Guinea* . . . . . 62. *V. leptospermoides* f. *glabrum*
- b. Branchlets quite glabrous. Pedicels rather stoutish, 3,5—5 mm. *New Guinea* . . . . . 66. *V. sanguineum*
- 50.a. Peduncle plus pedicel 3—4(—5) mm. Flowers 6—7-merous. Style bottle-shaped. *New Guinea* . . . . . 67. *V. lorentzii* f. *lorentzii*
- b. Peduncle plus pedicel (1—)2 mm. Flowers 5-merous. Style columnar. *New Guinea* . . . . . 68. *V. pullei*
- 51.a. Flowers subsessile. Peduncle plus pedicel up to 2 (rarely up to 2,5) mm long,  $\pm$  stoutish (not or hardly elongate in fruit) . . . . . 52
- b. Peduncle plus pedicel (3—)4—6 mm long, rather stoutish or mostly slender . . . . . 55
- 52.a. Corolla subcylindric-urceolate, (6—)7(—8) by 2,5(—3, rarely up to 4) mm. (Leaves narrowly obovate or elliptic-, or more rarely oblong-obovate, apex obtuse to rounded, base  $\pm$  cuneate.) *Philippines* . . . . . 69. *V. whitfordii*
- b. Corolla broad-urceolate, 4—5 by 3(—3,5) mm . . . . . 53
- 53.a. Leaves oblong-elliptic, more rarely oblong or elliptic (apex  $\pm$  obtuse to subacute), 0,4—0,7 (rarely up to 0,9) by  $\pm$  0,3 cm. *New Guinea* . . . . . 70. *V. amblyandrum* var. *amblyandrum*
- b. Leaves larger, elliptic, elliptic-oblong or more rarely lanceolate-elliptic, 0,8—1(—1,4) by (0,4—)0,5—0,6 cm. . . . . 54
- 54.a. Leaves subacute or obtuse at the apex. *New Guinea* . . . . . 70. *V. amblyandrum* var. *maiusculum*
- b. Leaves acute, or mostly rather pungent at the apex. *New Guinea* . . . . . 70. *V. amblyandrum* var. *pungens*
- 55.a. Style laxly hairy in the lower part. Filaments c. 4,5 mm. Leaves oblong-elliptic, (0,9—)1,5 by 0,5—0,7 cm. *New Guinea* . . . . . 71. *V. evanidinerium*
- b. Style quite glabrous. Filaments up to 3 mm. Leaves 0,4—1 by 0,2—0,4 cm . . . . . 56
- 56.a. Leaves elliptic or ovate-elliptic, apex  $\pm$  obtuse, 0,4—0,6(—0,7) by 0,25—0,4 cm, nerves practically obsolete. *New Guinea* . . . . . 72. *V. coelorum*

- b. Leaves  $\pm$  lanceolate, apex subacute, 0,5—0,7(—1) by 0,2—0,3 (rarely up to 0,4) cm, nerves generally raised beneath . . . . . 57  
 57.a. Pedicel 3—4 mm. Corolla white. *New Guinea* . . . . . 73. *V. prostratum*  
 b. Pedicel 5—6 mm. Corolla red. *New Guinea* . . . . . 74. *V. wollastonii*

29. *V. villosiflorum* J. J. S. in Gibbs, Arfak, 1917, 171; Sleum., Bot. Jahrb. 72, 1942, 228; Kaneh. & Hatus., Bot. Mag. Tokyo 56, 1942, 482.

NEW GUINEA. Northwestern part, Arfak Mts, Koebré ridge, 2590—2745 m, Gibbs 5629 (BM; K, type); ibid., 2300 m, Kanehira & Hatusima 13709 (A), 14077 (BO).

30. *V. pilosiflorum* J. J. S. in Gibbs, Arfak, 1917, 172; Nova Guinea 18, 1936, 110; Kaneh. & Hatus., Bot. Mag. Tokyo 56, 1942, 482; Sleum., Bot. Jahrb. 72, 1942, 228.

NEW GUINEA. Northwestern part, Arfak Mts, ridge running to Angi Lakes, 2440 m, Gibbs 6013 (BM, type); Mt Koebré, summit, 2200 m, Kanehira & Hatusima 13480 (A, BO). Mt Mundi, 1900 m, Mayr 8 (BO). Mt Ditschi, 1200 m, Mayr 19a (BO).

31. *V. finisterrae* Schltr, Bot. Jahrb. 55, 1918, 169, f. 9; Sleum., l. c. 72, 1942, 226. — *V. sessiliflorum* Schltr, l. c. 55, 1918, 170. — *V. parvulifolium* (non F. v. M.) Diels, l. c. 62, 1929, 488. — *V. haemanthum* Sleum., l. c. 72, 1942, 226.

NEW GUINEA. Northeastern part, Hunstein Mts, Sepik Distr., 1050—1350 m, Ledermann 8478 (K, SING), 8485 (BM; K, paratype of *V. sessiliflorum*), 11034 (B, type of *V. sessiliflorum*, †), 11403 (B, †). Finisterre Mts, Madang Distr., c. 1300 m, Schlechter 18188 (B, type of *V. finisterrae*, †; P). Morobe Distr., Mt Saruwaged and vicinity, 1500—2700(—3600?) m, Keysser 3 (B, '*V. parvulifolium*', †; BM); Clemens s.n. (B, type of *V. haemanthum*, †), 3598 A (B, †), 3926 A (B, †), 5894, 7176 (A; B, paratype of *V. haemanthum*), 9312 A (B), 9317 P, 9388 A (A; B, paratype of *V. haemanthum*); Matap, 1525—1830 m, Clemens 11175 (A); Rawlinson Range, 2135 m, Clemens 12308 (A), 41385 (A). Southeastern part, Centr. Distr., Murray Pass, Wharton Range, 2840 m, Brass 4613; ascent to Mt Victoria, main range NW of the 'Gap', c. 2440 m, Carr 15241, 15265.

32. *V. brachycladum* Sleum., nov. spec. — Frutex terrestris, 1—1,5 m altus, distaliter dense ramosus, ramis validis 4—5 mm diam. Ramuli brunnei, angulati, 1—1,5 mm diam., subdense breviter patenti-pilosi, dense foliati. Folia obovata vel elliptico-obovata, apice subrotundata et saepius levissime emarginata, basin versus  $\pm$  late in petiolum cuneata, glandulis marginalibus 2 a petiolo 1—2 mm distantibus minutis instructa, coriacea, in sicco supra pallide viridia, subtus brunnescentia, subtus laxe appresse glanduloso-muriculata, ceterum glabra, integra, submarginata, 1—1,5 cm longa, 0,6—0,9(—1) cm lata, margine plana, costa supra leviter impressa, subtus parum prominente, nervis lateralibus supra obscuris, subtus 2—3-paribus, basalibus et suprabasalibus, parum conspicuis, reticulatione nulla; petioli crassiusculi, initio pilosi, c. 2 mm longi. Flores axillares solitarii, sessiles, nutantes, basi bracteolis pluribus anguste deltoideis dorso glabris ciliatis c. 2 mm longis circumdati. Calyx glaber, tubo campanulato fere 2 mm longo, lobis deltoideis obtusiusculis imprimis apice ciliatis 1,5 mm longis. Corolla subcylindrico-urceolata, c. 7 mm longa, basi 3, apice 2 mm diam., rubra, carnosa, extus glabra, intus ad faucem laxe pilosa, lobis erecto-patentibus, 1,3 mm longis. Stamina 10; filamenta linearia, inferne parcepilosa, superne glabra, undata, 1,2—1,5 mm longa; thecae oblongae, 1 mm longae; tubuli thecis subaequilati, 0,5 mm longi, apice oblique scissi. Discus glaber. Stylus columnaris glaber fere 7 mm longus.

NEW GUINEA. Central part, Star Mts, Mt Antares, 3000 m, *Kalkman 4479* (L, type), common, fl. 23-7-1959.

33. *V. hatamense* Becc., Malesia 1, 1878, 210; Sleum., Bot. Jahrb. 72, 1942, 226.

NEW GUINEA. Western part, Arfak Mts, Hatam, 1525—2135 m, *Beccari* (*Herb. Beccari 5721*, FI, type); Mt Nettoti, Kebar valley, 100 km W of Manokwari, crest, 1980 m, *Van Royen 3896*. Wissel Lake region, slope and summit of Mt Mutaro, *Eyma 5210* (BO, L).

Very similar in leaf-character, flowers not present or not sufficiently developed:

NEW GUINEA. Western part, Mt Cyclops, 1400 m, *Mayr 570*. Southern part, Gauttier Mts, c. 900 m, *Gjellerup 879* (BO, L).

Note: The specimen von Römer 1143, mentioned with? under *V. hatamense* by Koorders, Nova Guinea 8 (4), 1912, 883, from Erica top, Oranje Mts, at 1460 m, has much broader leaves than *V. hatamense* and belongs to another species; being sterile, the plant is indeterminable.

34. *V. parvulifolium* F. v. M., Trans. R. Soc. Vict. 1 (2), 1889, 20; Sleum., Bot. Jahrb. 72, 1942, 235.

NEW GUINEA. Southeastern part, Centr. Distr., Mt Musgrave, 2135—2440 m, *McGregor s.n.* (BRI, fragm. ex MEL; BRSL, fragm. ex MEL; K, type; MEL ?, not seen); Mt Tafa, 2400 m, *Brass 4893*.

35. *V. scyphocalyx* Sleum., nov. spec. — Fruticulus epiphyticus, ramis superne iterum ramosis, teretibus, laxe pilosis vel glabrescentibus, 2—3 mm diam. Ramuli subangulati, patenter pilosi, graciles, subdense foliati. Folia obovata, iis *V. convexifolii* simillima, apice subrotundato-obtusata, basin versus cuneata, utroque latere glandula marginali minuta nigrescenti parum impressa 1—2 mm a petiolo remota instructa, subcoriacea, in sicco brunnea, supra in sicco paullo convexa, matura glabra, sed subtus sparsim glanduloso-punctata, interdum apice ipso fasciculo pilorum induta, integra, margine revoluta, 0,7—1 cm longa, 0,4—0,6(—0,7) cm lata, supra in sicco per faciem minute corrugata, subtus laevia, costa et nervis utroque latere 2-paribus supra parum conspicuis, subtus vix vel haud visibilibus, reticulatione nulla; petioli graciles, pubescentes, c. 1 mm longi. Flores axillares solitarii, sessiles, basi bracteolis pluribus minutis fulti. Calycis tubus campanulatus, glaber, 1,2 mm longus, lobi deltoidei, subacuti, laeves, ciliati, 0,8 mm longi. Corolla urceolata, rosea, sat tenera, extus laxe muriculata, intus pilosula, c. 4 mm longa, 2 mm diam., lobis suberectis 0,7 mm longis, quam tubus corollae pallidioribus. Stamina 10; filamenta subulato-lineariter, basi subdense pilosa, superne angustiora et glabra, 1,5 mm longa; thecae oblongae, granulatae, 0,7 mm longae, dorso breviter bicalcaratae; tubuli erecti, thecis dimidio angustiores, 0,5 mm longi, apice fere transverse scissi. Discus glaber. Stylus c. 3 mm longus, columnaris, in 2/3 infer. parte dense subappresse pilosus. Bacca subglobosa, matura c. 5 mm diam., violaceo-nigrescens.

NEW GUINEA. Central part, Star Mts, 1 km E of the mouth of the Minam R. into the Bon R., 1500 m, *Kalkman 4381* (L, type).



36. *V. versteegii* Koord., Nova Guinea 8 (1), 1909, 190; J. J. S., l. c. 12 (5), 1917, 520; l. c. 1918, t. 210; Sleum., Bot. Jahrb. 72, 1942, 227; Kaneh. & Hatus., Bot. Mag. Tokyo 56, 1942, 482.

NEW GUINEA. Southern part, Noord R., 'Nepenthes hill', *Versteeg 1300* (BO, syntype; K, L); Resi top, 900 m, *Versteeg 1639* (BO, lectotype = t. 210; K, L); Mt Dromedaris, 1250 m, *Pulle 608*. Beaufort R., 80 m, *Pulle 278*. Sibil valley, 1260 m, *Kalkman 4168*. Western Distr., Palmer R., 100 m, *Brass 7043*.

Note: Two forms can be distinguished in *V. versteegii*, one with smaller elliptic to subobovate-elliptic leaves as figured in t. 210 (which was based on *Versteeg 1639* from Resi top, and is matched by *Kalkman 4168*), and another form with more oblong- or elongate-obovate leaves as in *Versteeg 1300* from *Nepenthes* hill, mentioned as 'type' in Bot. Jahrb. 72, 1942, 227, but better to be regarded as syntype, matched by *Pulle 278* and *Brass 7043*. Both forms are connected by an intermediate form from Mt Dromedaris (*Pulle 608*).

Similar, but certainly distinct by its larger and thinner leaves (2—3.5 by 1—1.5 cm), which show a conspicuous fine and  $\pm$  dense reticulation beneath:

NEW GUINEA. Northern part, Rouffaer R., 175 m, *Docters van Leeuwen 9819* (A, BM, BO, L, P). Nabire, Bumi, 500 m, *Kanehira & Hatusima 12716* (cit. K. & H., not seen); *ibid.*, Dalman, *Kanehira & Hatusima 12070* (A).

37. *V. myrsinoides* Schltr, Bot. Jahrb. 55, 1918, 173; Sleum., l. c. 72, 1942, 227. — *V. collivagum* Sleum., l. c. 227.

NEW GUINEA. Northern part, Sepik Distr., Schrader Mts, 2070 m, *Ledermann 11703* (B, type of *V. myrsinoides*, †). Central part, Western Highlands, upper Minj R. valley, on Minj-Nona Divide, c. 3410 m, *Pullen 243*. Southeastern part, Centr. Distr., ascent to Mt Victoria, main range NW of the 'Gap', 2440 m, *Carr 15260* (A; B, type of *V. collivagum*, †; BM, L, SING).

38. *V. convexifolium* J. J. S., Med. Rijksherb. 25, 1915, 10; Nova Guinea 12 (5), 1917, 527; l. c. 1918, t. 216; Sleum., Bot. Jahrb. 72, 1942, 228.

NEW GUINEA. Southern part, ridge of Hellwig Mts, 2600 m, *Pulle 853* (BO, type; L).

39. *V. densifolium* J. J. S., Med. Rijksherb. 25, 1915, 9; Nova Guinea 12 (5), 1917, 525; l. c. 1918, t. 214; Sleum., Bot. Jahrb. 72, 1942, 228.

NEW GUINEA. Western part, Oranje Mts, Quarles valley, 3800 m, *Pulle (Versteeg) 2519* (BO, K; L, lectotype); ridge of the Hubrecht Mts, 3100 m, *Pulle (Versteeg) 2949*. Mt Wilhelmina area, 3360—3800 m, *Brass & Meijer Drees 9643*, 9653 A, 9913, 9913 A, 9961 A, 10329; *Brass 9421*.

40. *V. sparsicapillum* Sleum., nov. spec. — Frutex, ut videtur, sat parvus. Ramuli densi, novelli angulati, patenter puberuli, laxe minuteque verrucosi, deorsum glabrati, dense foliati. Folia elliptica, apice obtuse attenuata vel rotundata, basi in petiolum attenuata, glandulis 2 basalibus minutis a petiolo distantibus et subimpressis vestita, coriacea, supra in sicco cinerea et glabra, opaca, subtus brunnescentia laxequae pilis appressis glandulosis induta, ceterum epilosa, integra, in sicco plana, margine parum vel haud revoluta, 5—8 mm longa, 3—4 mm lata, costa supra  $\pm$  impressa, subtus vix prominente, nervis lateralibus supra obsoletis, subtus 2—3-paribus minute elevatis interdum vix visibilibus; petioli sat graciles, glabri vel citissime glabrescentes, (1—)2 mm longi. Flores hinc inde ex axillis superioribus solitarii. Pedunculus nullus.

Pedicelli sat graciles, glabri vel imprimis infra calycem muriculati, 3—4 mm longi, basi bracteis concavis ovato-oblongis (1,5 mm) involucrati. Calyx glaber, inferne in tubum obconicum 2 mm longum contractus, ad limbum patens, limbo ipso c. 1,3 mm alto, profunde in lobos 5 late deltoideos subacutos haud ciliatos partitus. Corolla urceolata, subcarnosa, extus glabra, intus in 2/3 superiore parte laxe longepilosa, 4 mm longa, colore haud cognita (probabiliter rubra), c. 2,5 mm diam. Stamina 10; filamenta linearia, glabra, 1,3 mm longa; thecae oblongae, echinulatae, c. 1,3 mm longae; tubuli thecis manifeste angustiores, erectae, c. 0,8 mm longae, poro sat parvo obliquo terminali haud dilatato pollen demittentes. Discus glaber. Stylus glaber, subclavatus, 2,5 mm longus.

NEW GUINEA. Western part, Wissel Lake region, bivouac 'voorrug' to 'voortop' bivouac, 1800—2900 m, *Eyma 5034a* (BO; L, type), fl. 1-8-1939.

41. *V. taxifolium* Sleum., nov. spec. — Frutex epiphyticus parvus, laxe tenuiter ramosus. Ramuli graciles, in partibus novellis dense breviter subhispidulo-pilosi, ceterum glabrescentes, subdense foliati. Folia anguste oblonga, apice obtusa vel rotundata, basi subtruncato-obtusa, glandulis basalibus fere petioliparibus vix distinctis ornata, subcoriacea, sat firma, basi infima et petiolo subhispidulo-piloso excepto glabra, sed subtus laxe glanduloso-punctata, integra, marginata, margine saepius paullo revoluta, 0,9—1,8 cm longa, 0,2—0,4 cm lata, costa nervisque supra  $\pm$  obsoletis, subtus paullo elevatis, nervis ipsis utroque latere 3—4 angulo acutissimo a costa abeuntibus alte ascendentibus margini subparallelis, reticulo venarum subtus minuto sed visibili; petioli 1—1,5 (—2) mm longi. Flores axillares solitarii, nutantes. Pedicelli subgraciles, glabri, (5—) 6—9 (—10) mm longi, basi bracteis pluribus minutis (0,5—1 mm) circumdati. Calyx plerumque omnino  $\pm$  dense breviter subvillosus vel hispidulo-pilosus, raro ad lobos glabrescens, tubo turbinato 1—1,5 mm longo, limbo patenti fere usque ad basin 5-partito, lobis deltoideis subacutis 1—1,3 mm longis. Corolla urceolata, tenera, ignea, extus glabra, intus in superiore parte laxe longepilosa, 6—8 mm longa, 3—5 mm diam., lobis obtusis, suberectis, 1 mm longis. Stamina 10; filamenta filiformia, basi paullo dilatata, in inferiore tertio laxepilosa, 3—3,5 mm longa; thecae late oblongae, echinulatae, 0,8—0,9 mm longae; tubuli quam thecae subaequilati et aequilongi, apice oblique truncati. Discus laxe longepilosus. Stylus crassiculus, glaber, 4—5 mm longus.

NEW GUINEA. Western part, Wissel Lake region, bivouac voorrug-voortop bivouac voet, 1800—2900 m, *Eyma 5034b* (BO; L, type), fl. 1-8-1939; Edarotali, E shore of Wissel Lake, 1800 m, *B.W. 3304 Rappard* (L), fl. red, 27-10-1955.

42. *V. wondiwoiense* J. J. S., Nova Guinea 18, 1936, 114, t. 29, f. 1; Sleum., Bot. Jahrb. 72, 1942, 228.

NEW GUINEA. Northwestern part, Geelvink Bay, Wandammen (Wasior), Mt Wondiwoi, 1800 m, *Mayr 384* (BO, type; L, fragm.).

43. *V. schultzei* Schltr., Bot. Jahrb. 55, 1918, 173; Sleum., l. c. 72, 1942, 228.

NEW GUINEA. Northern part, Sepik R., bivouac 48, c. 4° 45'—141° 10', *Schultze Jena 288* (B, type, †).

44. *V. cyclopense* J. J. S., Nova Guinea 12 (2), 1914, 156, t. 44; l. c. 18, 1936, 112, p.p.; Sleum., Bot. Jahrb., 72, 1942, 228. — *V. cyclopense* J. J. S.

var. *arfakense* J. J. S. in Gibbs, Arfak, 1917, 171. — *V. rariflorum* Schltr, Bot. Jahrb. 55, 1918, 171. — *V. ledermannii* Schltr, l. c. 172.

**f. cyclopense.**

NEW GUINEA. Northwestern part, Arfak Mts, ridge to Angi Lakes, 2440 m, Gibbs 5715 (BM, type of *V. cyclopense* var. *arfakense*). Central part, Star Mts, 1 km E of the mouth of the Minam R., 1500 m, Kalkman 4383. Northern part, Mt Cyclops, E slope, 1800 m, Gjellerup 539 (BO, type of *V. cyclopense*; L); ibid., Mayr 648, 649. Northeastern part, Torricelli Mts, 800 m, Schlechter 20165 (B, lectotype of *V. rariflorum*, †). Finisterre Mts, 1200 m, Schlechter 18183 (B, syntype of *V. rariflorum*, †; P). Bismarck Mts, 2500 m, Schlechter 18772 (B, syntype of *V. rariflorum*, †; P). Morobe Distr., Mt Saruwaged area, 1800(—3300?) m, Clemens 6927 (B, †), 9921 (A, B); Wau, Mt Kaindi, 2300 m, Brass 29720. 65 km S of mouth of the Tami R., 1600 m, Schultze Jena 33 (= 12, B, †). Sepik Distr., Hunstein Mts, 1050 m, Ledermann 8477 (B, lectotype of *V. ledermannii*, †; BM, K, SING); West Ra., 'Felspitze', 1400—1500 m, Ledermann 12375 (B, syntype of *V. ledermannii*, †). South-eastern part, Centr. Distr., ascent to Mt Victoria, main range NW of the 'Gap', 2895 m, Carr 15134.

**f. glabrum** Sleum., nov. forma. — Calyx dorso glaber, lobis longe ciliatis vel fimbriatis. Pedicelli graciles, glabri, (4—)5—6 mm longi. Corolla inferne pallide violacea vel rosea, superne dilute flavida, lobis viridescensibus.

NEW GUINEA. Central part, Sibil valley, 1260 m, Kalkman 4152 (L, type), fl. 26.5-1959; ibid., 1 km E of the mouth of the Minam R. into the Bon R., 1500 m, Kalkman 4383 A (L), together with f. *cyclopense*.

45. **V. culminicolum** Wernh., Trans. Linn. Soc. ser. 2 Bot. 9, 1916, 91; Sleum., Bot. Jahrb. 72, 1942, 229.

NEW GUINEA. Southern part, Utakwa R. to Mt Carstensz, 3200—3800 m, B. Kloss s.n. (BM, type).

46. **V. urnigerum** Sleum., nov. spec. — Frutex c. 50 cm altus, ramis apicibus valde ramosis. Ramuli novelli laxe patenter hispidulo-pilosuli et glanduloso-verruculosi, vetustiores glabrati, citissime corticati, cortice verrucis lenticellosis minutis oblecto, subdense foliati. Folia elliptica vel subobovato-elliptica, apice  $\pm$  rotundata, basi late attenuata, glandulis 2 basalibus minutissimis fere juxta petiolum instructa, coriacea, in sicco supra paullo convexa, initio ciliata et ad infimam basin petiolumque hispidula, ceterum glabra, maturitate petiolo excepto glabrescentia, integra, marginata, margine ipso in vivo rubescente, haud vel inferne parum revoluta, 0,5—1 cm longa, 0,3—0,5 lata, costa supra levissime impressa, subtus inferne tantum et obscurissime prominente, nervis lateralibus utroque latere c. 2-paribus supra inconspicue impressis, subtus obscuris, saepius utrinque obsoletis, reticulatione nulla; petioli graciles, 1—1,5 mm longi. Flores axillares singuli, nutantes. Pedunculi c. 1 mm longi. Pedicelli crassiusculi, infra calycem incrassati, 6—8(—9) mm longi, glabri, basi bracteis oblongis subacutis ciliatis apiceque barbatis ceterum glabris, 1,5—2 mm longis instructi. Calyx dense longe hispidulo-pilosus et glanduloso-muriculatus, tubo late turbinato c. 2 mm longo, limbo patenti, c. 1,5 mm longo, lobis deltoideis subacutis c. 1 mm longis. Corolla subgloboso-urceolata, basi rotundata, apice apiculato-contracta, (5—)6—7 mm longa, carnosula, intense vel raro dilutius rubra, in tertio inferiore 4(—5) mm diam., extus intusque glabra, lobis erectis c. 1,5 mm longis. Stamina 10; filamenta subulato-linearita, undata, basi et parum



supra basin sparse longepilosa, ceterum glabra, 2,5—3 mm longa; thecae oblongae, echinulatae, 1—1,2 mm longae; tubuli thecis subaequilongi et -lati, apice valde oblique scissi. Discus subdense longepilosus. Stylus crassus, medio dilatatus, glaber, 3,5 mm.

NEW GUINEA. Northwestern part, Vogelkop Peninsula, Kebar valley, c. 100 km W of Manokwari, c. 1980 m, *Van Royen 3860* (BO, CANB; L, type; LAE), fl. 28-10-1954, in heath vegetation on crest of the Nettoti Range; *ibid.*, *Van Royen 3861*, 3897.

47. *V. piceifolium* Wernh., Trans. Linn. Soc. ser. 2 Bot. 9, 1916, 92; Sleum., Bot. Jahrb. 72, 1942, 231. — *V. crassiflorum* (non J. J. S. 1912 and 1914) J. J. S., Nova Guinea 12 (5), 1917, 526; Sleum., Bot. Jahrb. 72, 1942, 231, p. p. — *V. sp.*, Koord., Nova Guinea 8 (4), 1912, 884.

NEW GUINEA. Southern part, Utakwa R. to Mt Carstensz, 2040—2530 m, *B. Kloss s.n.* (BM, type). Hellwig Mts, 2600 m, *Pulle 574, 856* (*V. 'crassiflorum'*); *ibid.*, Agathodaemon top, 2000—2500 m, *von Römer 1206* (BO).

48. *V. pugionifolium* Sleum., Bot. Jahrb. 72, 1942, 230.

NEW GUINEA. Northeastern part, Morobe Distr., Sambanga (Mt Saruwaged area), 2000 m, *Clemens 7177* (B, type, †).

49. *V. bodenii* Wernh., Trans. Linn. Soc. ser. 2 Bot. 9, 1916, 91; Sleum., Bot. Jahrb. 72, 1942, 231.

NEW GUINEA. Southern part, Utakwa R. to Mt Carstensz, 3350—3800 m, *B. Kloss s.n.* (BM, type).

50. *V. absconditum* J. J. S., Nova Guinea 18, 1936, 113, t. 28, f. 2; Sleum., Bot. Jahrb. 72, 1942, 228.

NEW GUINEA. Northern part, Nassau Mts West, 2500—2600 m, *Docters van Leeuwen 10841* (BO, L), *10904* (BO, type).

51. *V. ceramense* Sleum., nov. spec. — *V. microphyllum* (non Bl.) J. J. S. in Fedde, Rep. 30, 1932, 177.

Fruticulus, ut videtur, terrestris, ramis gracilibus elongatis, apicibus breviter ramosis. Ramuli gracillimi, patenter puberuli, laxe foliati. Folia elliptica vel oblongo-elliptica, apice rotundata vel plerumque levissime emarginata, basi late attenuata et in petiolum abeuntia, glandulis duabus marginalibus minutissimis ad basin instructa, subcoriacea, glabra, subtus sparse glanduloso-punctata, integra, margine imprimis inferne parum revoluta, 0,7—1 cm longa, 0,4(—0,5) cm lata, evenia vel costa cum nervis utroque latere 2 interdum subtus elevata; petioli graciles, pubescentes, c. 1,5 mm longi. Flores rari, axillares solitarii. Pedicelli crassiusculi, glabri, sed superne pilis paucis glandulosis obsiti, c. 5 mm longi, basi bracteis nonnullis minutis suffulti. Calyx late campanulatus, glaber, tubo turbinato vix 1 mm longo, limbo patenti fere usque ad basin 5-partito, lobis deltoideis acutis 1,5 mm longis. Corolla urceolata, carnosula, rubra, extus inferne laxe glanduloso-muriculata, epilosa, intus omnino laxe pilosa, 5 mm longa, c. 2,5 mm diam., lobis 1 mm longis. Stamina 10; filamenta subulata, basi et paullo supra basin subvillosa, ceterum glabra, 2,5 mm longa; thecae oblongae, echinulatae, 0,9 mm longae; tubuli thecis subaequilongi et -lati. Discus subdense longe erecto-pilosus. Stylus glaber, 3,5 mm longus.

MOLUCCAS. Central Ceram, G. Murkele, 1900—2500 m, *Rutten (Kornasi) 1474* (BO; L, type), fl. 1-7-1918, abundant in primeval forest on limestone.

52. *V. whiteanum* Sleum., Notizbl. Berl.-Dahlem 12, 1935, 486; Bot. Jahrb. 72, 1942, 234.

SOLOMON ISL. Bougainville, Lake Luralu, 1500 m, *Kajewski* 2062 (A, BM, BO; BRI, type; G, P).

53. *V. igneum* J. J. S., Nova Guinea 18, 1936, 112, t. 28, f. 1; Sleum., Bot. Jahrb. 72, 1942, 231.

NEW GUINEA. Northern part, Doormantop, 1420 m, *Lam* 1520, 1555 (BO, type; L); *ibid.*, 2480 m, *Lam* 1929.

54. *V. sororium* J. J. S., Med. Rijksherb. 25, 1915, 10; Nova Guinea 12 (5), 1917, 526; l. c. 1918, t. 215; Sleum., Bot. Jahrb. 72, 1942, 232. — *V. cryptodon* Sleum., l. c. 236.

NEW GUINEA. Western part, Wissel Lake region, Enarotali-Kugapa-Egogitoagapa, *Eyma* 4794, 4805; Edarotali, 1800 m, *B.W.* 3306 *Rappard*. Top of Wichmann Mts, 3000 m, *Pulle* 996 (BO, type of *V. sororium*; L). Oranje Mts, Lake Habbema area, 3000—3225 m, *Brass* 9054, 9317, 10670 (A, BO; L, type of *V. cryptodon*).

55. *V. whitmeei* F. v. M., Pap. Proc. R. Soc. Tasm. (1875) 1876, 103; Christophersen, Bern. P. Bish. Mus. Bull. 128, 1935, 166; Sleum., Bot. Jahrb. 72, 1942, 228. — *V. antipodum* Reinecke, l. c. 25, 1898, 664.

SAMOA. Savaii, *Whitmee* 115 (BM; K, type of *V. whitmeei*); *Powell* 228; *Vaupel* 446; *Christophersen* 827, 867, 885; *Christophersen & Hume* 2171, 2215; *Reinecke* 435 (B, type of *V. antipodum*, †; BO, G).

56. *V. decumbens* J. J. S., Nova Guinea 18, 1936, 110, t. 26, f. 2; Sleum., Bot. Jahrb. 72, 1942, 231. — *V. chionostomum* Sleum., l. c. 231.

NEW GUINEA. Northern part, Doormantop, 3200 m, *Lam* 1769 (BO, type of *V. decumbens*; K, L). Oranje Mts, Wilhelmina top area, 3400 m, *Brass & Meijer Drees* 9653 (A, BO; L, type of *V. chionostomum*); Lake Habbema, 3225 m camp, *Brass* 9015.

57. *V. crassiflorum* J. J. S., Bull. Jard. Bot. Btzg II, 8, 1912, 52; Nova Guinea 12 (2), 1914, 157, t. 45 A; Sleum., Bot. Jahrb. 72, 1942, 231, p. p., nec J. J. S., Nova Guinea 12 (5), 1917, 526. — *V. ciliatipetalum* J. J. S. Nova Guinea 18, 1936, 108, t. 25, f. 2; Sleum., Bot. Jahrb. 72, 1942, 232.

NEW GUINEA. Western part, Mt Goliath, 2500—3000 m, *De Kock* 52 p.p. (BO, not seen), 149 (BO, type of *V. crassiflorum*; L, fragm.). Doormantop, 3200—3260 m, *Lam* 1633, 1663, 1677, 1697 (all syntypes of *V. ciliatipetalum*, BO, L), 1758 (BO, lectotype of *V. ciliatipetalum*, conserved in alcohol, not seen). Oranje Mts, Habbema Lake, 3225 m camp, *Brass* 9181, 9575; Wilhelmina top, 3800 m, *Brass & Meijer Drees* 10038.

58. *V. oreomyrtus* Sleum., Bot. Jahrb. 72, 1942, 233. — *V. luridum* Sleum., l. c.

NEW GUINEA. Western part, Lake Habbema vicinity, 2800—3000 m, *Brass* 10524 (A, BM, BO; L, type of *V. oreomyrtus*), 10672. Idenburg R., S.W. of Bernhard camp, 1800—2150 m, *Brass* 12105, 12446 (A, BM, BO; L, type of *V. luridum*; LAE).

59. *V. oranjense* J. J. S., Med. Rijksherb. 25, 1915, 9; Nova Guinea 12 (5), 1917, 524; l. c. 1918, t. 213; Sleum., Bot. Jahrb. 72, 1942, 234. — *V. buxoides* J. J. S., Nova Guinea 18, 1936, 111, t. 27, f. 1; Sleum., Bot. Jahrb. 72, 1942, 234. — *V. disterigmoides* Sleum., l. c. 232.

var. *oranjense*.

NEW GUINEA. Western part, Doormantop, 3000 m, *Lam 1996* (BO, type of *V. buxoides*, conserved in alcohol, not seen). Oranje Mts, Meerbivak, 3600 m, *Pulle (Versteeg) 2503* (BO, type of *V. oranjense*; K, L). Mt Wilhelmina area, 3400—3560 m, *Brass & Meijer Drees 9622, 9666* (A; L, type of *V. disterigmoides*), *9865, 9865, 9904 A p.p.*

Similar, with subacuminate leaves and smaller flowers:

NEW GUINEA. Northwestern part, Vogelkop Peninsula, Kebar valley, c. 100 km W of Manokwari, on crest of the Nettoti Range, c. 1980 m, *Van Royen 3871*.

var. *marginellum* (Sleum.) Sleum., nov. stat. — *V. marginellum* Sleum., Bot. Jahrb. 72, 1942, 229.

NEW GUINEA. Northern part, Oranje Mts, Lake Habbema, 3225 m camp, *Brass 9224* (A, BO; L. type); Mt Wilhelmina area, 3400—3800 m, *Brass & Meijer Drees 9804, 9904 A p.p., 9907, 10310*. Doormantop, 3250 m, *Lam 1634* (as *V. cyclopense* in J. J. S., Nova Guinea 18, 1936, 112).

60. *V. microphyllum* Reinw. ex Bl., Bijdr. 1826, 851; G. Don, Gen. Syst. 3, 1834, 857; Dun. in DC., Prodr. 7, 1839, 576; Miq., Fl. Ind. Bat. 2, 1859, 1063; Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 38; l. c. 1864, 221; F.-Vill., Novis. App. 1880, 121; Merr., Philip. J. Sc. 1, 1906, Suppl. 221; l. c. 3, 1908, Bot. 371; Elm., Leaf. Philip. Bot. 3, 1911, 1092; Koord-Schum., Syst. Verz. 3, 1914, 100; Merr., En. Philip. 3, 1923, 250; Copel. f., Philip. J. Sc. 42 (4), 1930, 600, pl. 7, f. 3—7, non K. & G., J. As. Soc. Beng. 74, ii, 1905, 62; Merr., En. Born. 1921, 464; Burk. & Holtt., Gard. Bull. Str. S. 3, 1923, 57 (= *Diplycosia elliptica* Ridl.). — *Gaultheria blumei* F. v. M., Trans. R. Soc. Vict. n. s. 1 (2), 1889, 21, in text sub *G. mundula*, nom. superfl. pro *Vaccin. microphyll.* Bl., cf. Sleum., Reinwardtia 4 (2), 1957, 184. — *V. mindorense* Rendle, J. Bot. 34, 1896, 355; Merr., Philip. J. Sc. 2, 1907, Bot. 293.

PHILIPPINES. Luzon, Laguna, Mt Banahao, *Merrill 7519*. Mindoro, Mt Dulangan, 1220—1525 m, *Whitehead s.n.* (BM, type of *V. mindorense*; K); Mt Halcon, 1400 m, *F. B. 4414 Merritt*; *PNH 3579 Edano*; *Merrill 5676*. Negros, Canlaon volcano 1960 m, *Merrill 234*; *PNH 22022 Edano*; Cuernos Mts, *Elmer 9540*. Panay, Antique prov., Mt Madaas, *Yoder s.n.* (PNH, †, cit. Copel., not seen). Mindanao, Davao, Mt Apo, summit, c. 3200 m, *Copeland s.n.* (PNH, †, cit. Copel., not seen); *Copeland 1037, 1417*; *Mearns s.n.* (US, cit. Copel., not seen); *Hachisuka s.n.* (BM); *Elmer 11394*; *Clemens s.n.* (UC, cit. Copel., not seen); *Williams 2554*; *PNH 1463 Edano*; *PNH 34629 Pancho*.

MOLUCCAS. Ternate, Pic of Ternate, crater, 1400 m, *Teysmann H. B. 5170, 14052*; *de Vriese s.n.*; *Anang* (Exp. De Haan) *16a*; *Reinwardt anno 1821* (L, type; P, S); *Beguín 1528*; *Beccari* (Herb. Beccari 5713, FI); *Moseley s.n.* Tidore, summit, *Reinwardt anno 1821* (L). Halmahera, G. Api, 1500 m, *Idjan-Mochtar 57*.

NEW HEBRIDES. Espiritu Santo, Mt Tabwemasana, 1830 m, *Oxford Exp. 22* (BM; bearing a fine tuft of hairs at the apex of the calyx lobes, which is not present in the above cited material from the Moluccas and the Philippines).

61. *V. globosum* J. J. S., Nova Guinea 12 (2), 1914, 155, t. 43; Sleum., Bot. Jahrb. 72, 1942, 235; Kanich. & Hatus., Bot. Mag. Tokyo 56, 1942, 481. — *V. globosum* J. J. S. var. *latifolium* J. J. S. in Gibbs, Arfak, 1917, 171.

NEW GUINEA. Western part, Arfak Mts, Angi Lakes and vicinity, 1800—2200 m, *Gjellerup 1056* (BO, type of *V. globosum*; L); *Gibbs 5946* (BM, type of *V. globosum* var. *latifolium*; BO, K); *Kanehira & Hatusima 13738, 13452, 13794*; *Kostermans 2112, 2434*; Mt Mundi, 1900 m, *Mayr 14 p.p.* (BO). Wissel Lake region, Enarotali-Kugapa-Egogitoagapa, *Eyma 4809*; *ibid.*, look-out Perai, *Eyma 5266*.



Similar in leaves, but pedicels shorter; flowers not known:

NEW GUINEA. Central part, Star Mts, Mt Antares, 3000 m, *Kalkman* 4475.

62. *V. leptospermoides* J. J. S., Nova Guinea 12 (2), 1914, 154, t. 42; Sleum., Bot. Jahrb. 72, 1942, 234; Kaneh. & Hatus., Bot. Mag. Tokyo 56, 1942, 481.

f. *leptospermoides*.

NEW GUINEA. Northwestern part, Arfak Mts, Angi Lakes, 1900—2300 m, *Gjellerup* 1035 (BO, type; L); *Kanehira* & *Hatusima* 13584 (cit. Kaneh. & Hatus., not seen); *Kostermans* 2485 p.p. Mt. Mundi, 1800 m, *Mayr* 14 p.p. (B, †), 18b (BO).

f. *glabrum* J. J. S. in Gibbs, Arfak, 1917, 171.

NEW GUINEA. Northwestern part, Arfak Mts, Angi Lakes, 2200—2440 m, *Gibbs* 6012 (BM, type); *Kostermans* 2485 p.p.; *Kanehira* & *Hatusima* 13989 (A).

63. *V. vonroemerii* Koord., Nova Guinea 8 (4), 1912, 883; J. J. S., l. c. 12 (2), 1914, 154, nota sub *V. lept.*; l. c. 12 (5), 1917, 523; Sleum., Bot. Jahrb. 72, 1942, 236.

NEW GUINEA. Southern part, Oranje Mts, Erica top, 1460—1520 m, *von Römer* 1049 (BO, type); *Pulle* 821. Mt Dromedaris, 1250 m, *Pulle* 609. Mt Hellwig, 1900 m, *Pulle* 831.

64. *V. barbatum* J. J. S., Nova Guinea 18, 1936, 109, t. 27, f. 2; Sleum., Bot. Jahrb. 72, 1942, 235.

NEW GUINEA. Northern part, Nassau Mts West, 2600 m, *Docters van Leeuwen* 10832 (BO, type; L), 10833, 10916.

65. *V. inconspicuum* J. J. S., Nova Guinea 18, 1936, 109, t. 26, f. 1; Sleum., Bot. Jahrb. 72, 1942, 235.

NEW GUINEA. Northern part, Nassau Mts West, 2600 m, *Docters van Leeuwen* 10863 (A; BO, type; L, SING). Idenburg R., near Bernhard Camp, 2100—2150 m, *Brass* 12181, 12447, 12625.

66. *V. sanguineum* Schltr, Bot. Jahrb. 55, 1918, 172.

NEW GUINEA. Northern part, Sepik Distr., Schrader Mts, c. 2070 m, *Ledermann* 11619 (B, †), 11702 (B, type, †). Central part, Mt Antares, 2360 m, *Kalkman* 4432, 4467.

Note: In my revision of the genus *Vaccinium* in New Guinea (Bot. Jahrb. 72, 1942, 235) *V. sanguineum* was considered to be a synonym of *V. globosum*. As no type or paratype material of *V. sanguineum* is left, it is not possible to confirm the synonymy. There are some discrepancies in the description of *V. sanguineum* with that of the true *V. globosum* which suggest to keep *V. sanguineum* apart, especially as the material collected by Kalkman matches the description into the details.

67. *V. lorentzii* Koord., Nova Guinea 8 (2), 1912, 883; J. J. S., l. c. 12 (2), 1914, 157; l. c. 12 (5), 1917, 521; l. c. 1918, t. 211; Sleum., Bot. Jahrb. 72, 1942, 235.

**f. lorentzii.**

NEW GUINEA. Southern part, Hellwig Mts, 1350—1600 m, *von Römer 1113* (BO, lectotype; L, fragm.); *ibid.*, Erica top, 1460 m, *von Römer 1041* (BO, syntype; L, fragm.); *ibid.*, Bijenkorf bivouac, 1750—1900 m, *Pulle 654 p.p.* (L), 829. Johannes Keyts Mts, 2000 m, *Le Cocq d'Armandville 141* (BO?, cit. J. J. Smith, not seen). Mt Goliath, 2500—3000 m, *Dè Kock 52* (BO?, cit. J. J. Smith, not seen).

**f. puberulum** J. J. S., Nova Guinea 12 (5), 1917, 522; Sleum., Bot. Jahrb. 72, 1942, 236.

NEW GUINEA. Southern part, Hellwig Mts, Bijenkorf bivouac, 1750 m, *Pulle 654 p.p.* (BO, type; L).

68. **V. pullei** J. J. S., Med. Rijksherb. 25, 1915, 8; Nova Guinea 12 (5), 1917, 522; l. c. 1918, t. 212; l. c. 18, 1936, 108; Sleum., Bot. Jahrb. 72, 1942, 235. — *V. hatamense* (non Becc.) Koord., Nova Guinea 8 (4), 1912, 883.

NEW GUINEA. Southern part, Hellwig Mts, 1700 m, *Pulle 707* (BO, lectotype; L); *ibid.*, Bijenkorf bivouac, 1900 m, *Pulle 837* (BO, syntype; L); *ibid.*, Erica top, *von Römer 1143* (BO). Northern part, Nassau Mts, West, 2500 m, *Docters van Leeuwen 10843*.

Similar and possibly belonging here:

NEW GUINEA. Northern part, Mt Cyclops, 1700 m, *Mayr 579* (B, †). Southern part, Weyland Mts, *Stein 226* (B, †). Mt Carstensz, Dajakweide, 3700—4000 m, *Wissel 85* (BO).

69. **V. whitfordii** Merr., Philip. J. Sc. 2, 1907, Bot. 295; l. c. 3, 1908, Bot. 372; Brown, Min. Prod. Philip. For. 2, 1921, 362; Merr., En. Philip. 3, 1923, 252; Copel. f., Philip. J. Sc. 42 (4), 1930, 594, pl. 6, f. 6—8. — *Gaultheria sp.*, Vid., Rev. Pl. Vasc. Filip. 1886, 170.

PHILIPPINES. Luzon, Ilocos Norte prov., Mt Nagapatan, *B. S. 33210 Ramos*. Abra prov., Mt Paraga, *B. S. 7108 Ramos*. Mountain prov., Bontoc subprov., *F. B. 13405 Klemme; F. B. 10976 Curran*. Lepanto subprov., trail to Balbalasan, *F. B. 5741 Klemme* (PNH, †, syntype, cit. Copel., not seen); Mt Malaya, *F. B. 16581 Darling* (cit. Copel., not seen). Benguet subprov., *Vidal 1921* ('*Gaultheria sp.*', FI, K, L, MA); Baguio, *Merrill 712; Bucao, F. B. 14428 Darling; Pauai, Clemens 9110; B. S. 31971 Santos; Mt Data, Loher 3769*. Ifugao subprov., Mt Polis, *B. S. 19697 McGregor; B. S. 37611 Ramos & Edano*. Nueva Ecija prov., Mt Umingan, *B. S. 26296 Ramos & Edano*. Tayabas prov., Mt Alzapan, *B. S. 45661*. Rizal prov., *Loher 12599* (UC, cit. Copel., not seen). 'Central Luzon', Bulagloco, *Loher 3768*. Camarines Sur prov., Mt Isarog, 1525 m, *B. S. 76282 Santos*. Mindoro, Mt Halcon, Ilong Peak, 1600—2400 m, *Merrill 5798* (syntype, NY; US, cit. Copel., not seen); PNH 3307, 3579 *Edano; PNH 20500 Rabor. Leyte, F. B. 16887 Rosenbluth*. Negros, Mt Silay, *Whitford s.n.* (K; PNH, lectotype, †; US, cit. Copel., not seen); Canlaon volcano, *Merrill 6979*.

70. **V. amblyandrum** F. v. M., Trans. R. Soc. Vict. 1 (2), 1889, 19 (sphalm. 'ambyandrum'); Sleum., Bot. Jahrb. 72, 1942, 237.

**var. amblyandrum.**

NEW GUINEA. Southeastern part, Centr. Distr., Owen Stanley Range, summits, *McGregor anno 1889* (MEL, type). Ascent to Mt Victoria, NW of the 'Gap', c. 2440 m, *Carr 15239; ibid.*, Mt Ganeve, 2590 m, *Carr 15293*. Mt Tafa, 2700 m, *Brass 4848*. Mt Albert Edward, 3680 m, *Brass 4214, 4323, 4325, 4423a*. Murray Pass, Wharton Range, 2840 m, *Brass 4599*. Central part, Mt Antares, 3300 m, *Kalkman 4513*. Eastern Highlands, Mt Wilhelm, 3350—4265 m, *N. G. F. 260 Keogh* (LAE); near Kerigomna camp, Goroka subdistr., c. 3000 m, *Hoogland & Pullen 5595*; above Kerowagi, 2440 m, *Robbins 1210* (CANB).

var. *maiusculum* Sleum., Bot. Jahrb. 72, 1942, 237.

NEW GUINEA. Northeastern part, Morobe Distr., Samanzing vicinity, 2135—2440 m, *Clemens* 9377 (A; B, type); Goliteng camp, 2000—2300 m, *Clemens* 5206 A (B, †). Mt Saruwaged, 2300—3300 m, *Clemens* s.n. (B, †), 5893 (A), 5890 (B, †), 7289 (B, †), 9562 (B, †). Wantoat vicinity, 2135—2440 m, *Clemens* 11323 (A). South-eastern part, Milne Bay Distr., Mt Dayman, Maneau Ra., 2230—2240 m, *Brass* 22223; *ibid.*, 2285—2745 m, *Cruttwell* 524, 745. Mt Simpson, 2590 m, *Cruttwell* 58 (K).

var. *pungens* Sleum., nov. var. — Foliis ellipticis rarius lanceolato-ellipticis, apice distincte acuminatis, acutis vel subpungentibus, 0,8—1,4 cm longis, 0,4—0,6 cm latis diversum.

NEW GUINEA. Central part, Western Highlands, Waghi Divide area, 2895 m, *N. G. F.* 5187 *Womersley*. Hagen Range, c. 3350 m, *Shaw Mayer* s.n. (BM); *Stonor* 2 (E). Eastern Highlands, Mt Wilhelm, E slopes, 3500 m, *Brass* 30082; *ibid.*, Lake Piunde vicinity, c. 3615 m, *N. G. F.* 8835 *Womersley* (BRI; L, type; LAE, SING); *ibid.*, Lake Aunde vicinity, 3505 m, *N. G. F.* 8915 *Womersley*.

71. *V. evanidinervium* Sleum., nov. spec. — Frutex terrestris, c. 1,5 m altus. Rami erecti, sat robusti, apicibus, divaricato-ramosi. Ramuli rubescentes, apicibus subangulati et subdense breviter albido-pilosi, inferne subteretes et glabrescentes, dense foliati. Folia oblongo-elliptica, apice breviter subacuminato-attenuata, apice ipso subacuta vel obtusiuscula, basi  $\pm$  late attenuata, utroque latere glandula marginali minuta a petiolo valde remota instructa, coriacea, glabra, subtus subnitentia, inferne integra vel per totum marginem vel certe in superiore dimidia parte minute sed bene visibiliter crenulata (crenaturis initio glandula caduca minuta terminatis), (0,9—)1—1,5 cm longa, 0,5—0,7 cm lata, costa supra leviter impressa, subtus parum prominente, nervis lateralibus utroque latere c. 3, pinnatis, sursum curvatis et anastomosantibus, supra  $\pm$  inconspicuis, subtus in foliis junioribus cum rete venarum laxo  $\pm$  distincte prominulis, in foliis plane maturis multo minus visibilibus vel omnino evanescentibus; petioli graciles,  $\pm$  2 mm longi. Flores in axillis superioribus paucis digesti, solitarii. Pedunculus c. 1 mm longus, bracteis basalibus nonnullis ovatis ciliolatis  $\pm$  involucreto. Pedicelli 3—5 mm longi, sat robusti, laxe minute subglanduloso-pilosi vel muriculati. Calyx glaber, nitidus, tubo rugosulo subcampanulato-obconico 2—2,5 mm longo, apice c. 2 mm diam., limbo valde patenti,  $\pm$  1,5 mm alto et 4—5 mm diam., breviter 5-lobulato vel -denticulato, lobis late deltoideis subacutis ciliatis c. 0,5 mm longis. Corolla subcylindrico-urceolata, carnosa, laete rubra, utrinque glabra, c. 9 mm longa, c. 5 mm diam., lobis erectis subacutis 1,5 mm longis. Stamina 10; filamenta filiformia, ad basin parum dilatata, inferne pilis paucis elongatis adspersa, ceterum glabra, c. 4,5 mm longa; thecae oblongae, 1,2 mm longae; tubuli thecis paullo augustioris, apice leviter curvati et dilatati, oblique scissi, 0,8 mm longi. Discus glaber. Stylus columnaris, in tertio inferiore laxe subappresse longepilosus, 7 mm longus, 1 mm crassus. Fructus deest.

NEW GUINEA. Central part, Western Highlands, Mt Kinkain, Central Kubor Range, Upper Minj R. valley, c. 3600 m, *Pullen* 215 (CANB; L, type), fl. 27-7-1957.

72. *V. coelorum* Wernh., Trans. Linn. Soc. ser. 2 Bot. 9, 1916, 91; Sleum., Bot. Jahrb. 72, 1942, 237. — *V. arenarium* Sleum., l. c. 232.

NEW GUINEA. Western part, ascent to Mt Carstensz, 3200—3810 m, *B. Kloss* s.n. (BM, type of *V. coelorum*); *ibid.*, up to 4000 m, *Dozy* s.n. Oranje Mts, N slope of Mt Wilhelmina, 3950 m, *Brass & Meijer Drees* 10209 (A; L, type of *V. arenarium*).



73. *V. prostratum* Sleum., Bot. Jahrb. 72, 1942, 230.

NEW GUINEA. Northeastern part, Morobe Distr., Mt Saruwaged, 3050—3655 m, *Clemens* 7290 (A; B, type).

74. *V. wollastonii* Wernh., Trans. Linn. Soc. ser. 2 Bot. 9, 1916, 93; Sleum., Bot. Jahrb. 72, 1942, 237.

NEW GUINEA. Western part, Utakwa R. to Mt Carstensz, 2530—3810 m, *B. Kloss* s.n. (BM, type of *V. wollastonii*); Mt Carstensz, 3800—4400 m, *Wissel* 17, 41, 112, 153 (differing by a hairy disk). Oranje Mts, Mt Wilhelmina area, 3560—3750 m, *Brass & Meijer Drees* 9624, 10386.

5. Sect. *Neojunghuhnia* (Koord.) Sleum., Bot. Jahrb. 71, 1941, 419; l. c. 72, 1942, 217, 238. — *Neojunghuhnia* Koord., Nova Guinea 8 (1), 1909, 183, t. 48. — *Disiphon* Schltr, Bot. Jahrb. 55, 1918, 166, f. 8.

Type species: *V. insigne* (Koord.) J. J. S.

The section is confined to New Guinea.

## Key to the species

- 1.a. Tubules narrow-cylindrical, parallel to, but well separated from each other, laxly set with stalked glands, transversely cut at the very apex, the pore round. Corolla at least partly pubescent . . . . . 2
- b. Tubules broad-cylindrical, parallel and close to each other, never set with stalked glands, obliquely cut at the apex, the pore thus  $\pm$  elliptic, the back of each tubule  $\pm$  prolonged into a kind of tooth, which may be minutely bidentate again. Corolla glabrous or practically so . . . . . 5
- 2.a. Corolla ellipsoid-urceolate or ventricose, gradually attenuate at both ends, widest in the middle, white, all over laxly hairy. (Leaves (3—)4—6 by (1,5—)2—3 cm.) 75. *V. schlechterianum*
- b. Corolla elongate-urceolate, very shortly attenuate at the base,  $\pm$  long so towards the mouth, widest below the middle, but partially hairy . . . . . 3
- 3.a. Corolla (red), laxly hairy along 5 vertical stripes. (Leaves ovate, (2,5—)3—4 by 1—1,8 cm.) . . . . . 76. *V. kostermansii*
- b. Corolla laxly hairy at the apex, glabrous for the rest . . . . . 4
- 4.a. Corolla white. Leaves ovate, 3—5,5 by (1,5—)1,8—3,5 cm, base rounded to subcordate . . . . . 77. *V. insigne*
- b. Corolla (pale) pink with reddish lobes. Leaves narrowly elliptic-ovate, 2,5—4 by 1—1,5 cm, base broadly cuneate . . . . . 78. *V. malacothrix*
- 5.a. Calyx lobes (laciniae) relatively short, i. e. equalling  $\pm$   $\frac{1}{4}$ — $\frac{1}{3}$  of the total corolla length at full anthesis . . . . . 6
- b. Calyx lobes (laciniae) equalling at least half the total corolla length at full anthesis . . . . . 8
- 6.a. Calyx lobes narrow-deltoid to broad-subulate,  $\pm$  gradually attenuate or acuminate distally. (Thecae distinctly acute.) . . . . . 79. *V. oreites*
- b. Calyx lobes subulate, i. e.  $\pm$  abruptly narrowed upwards from a rather broad base into a long needle-like distal part . . . . . 7
- 7.a. Calyx and pedicels glabrous. Thecae bluntish . . . . . 80. *V. timonioides*
- b. Calyx and pedicels laxly to subdensely patent-hairy, finally  $\pm$  glabrescent. Thecae distinctly acute . . . . . 81. *V. longisepalum*
- 8.a. Leaves very densely imbricate, enclosing the branchlets . . . . . 82. *V. imbricans*
- b. Leaves more laxly to subdensely arranged, leaving the branchlets visible at least for their greater part . . . . . 9
- 9.a. Leaves ovate-lanceolate, (3,5—)4—5 by 1—1,6 cm, base broadly attenuate . . . . . 83. *V. hispidulissimum*
- b. Leaves (broadly or narrowly) ovate, base rounded to subcordate . . . . . 10
- 10.a. Leaves relatively large, (5—)6—8 by 3—4 cm . . . . . 84. *V. cardiophorum*
- b. Leaves smaller, up to 5 by 2,3 cm . . . . . 11
- 11.a. Calyx lobes glabrous dorsally, ciliate, 4—5 mm long. Branchlets and pedicels equally set with eglandular and gland-tipped hairs. (Leaves laxly soft-hispidulous

on the midrib (and sometimes on the edge) underneath, otherwise set with sparse shorter, dark, subappressed glandular hairs on the intervenium. Style glabrous.)

85. *V. spaniotrichum*  
 b. Calyx lobes densely softly hispidulous, dorsally so at least in the lower half, 6—7 mm long. Branchlets and pedicels exclusively set with eglandular hairs . . . . . 12  
 12.a. Leaves densely softly hispidulous all over the undersurface, the hairs with a manifestly thickened foot which persists when the proper hair is gone as a sort of minute wart, no proper glandular hairs present. Style glabrous 86. *V. subulisepalum*  
 b. Leaves softly hispidulous exclusively along the midrib underneath, the foot of the hairs not thickened, otherwise clad with short appressed dark glandular hairs. Style hairy to nearly the top . . . . . 87. *V. eymae*

75. *V. schlechterianum* Sleum., Bot. Jahrb. 71, 1941, 425; l. c. 72, 1942, 240. — *Disiphon papuanum* Schltr, l. c. 55, 1918, 166, f. 8 (non *V. papuanum* J. J. S. 1919).

NEW GUINEA. Northeastern part, Sepik R. region, 'Etappenberg' (Abrupt Mt), 850 m, *Ledermann 9461* (B, type, †).

76. *V. kostermansii* Sleum., nov. spec. — Frutex c. 3 m altus. Ramuli valde ramosi, laxe foliati, teretes, tenues et flexiles, partibus novellis patentem (1—2 mm) hispidulo-pilosis, vetustioribus glabrescentibus citoque corticatis. Folia ovata, apice subabrupte caudato-acuminata, acuta, glandula apicali minuta instructa, basi rotundata usque leviter cordata, subcoriacea, novella utrinque pilosa, matura supra  $\pm$  glabrescentia, subtus per faciem laxa, ad marginem et costam densius pilis longis hispidulis erectis basi vix incrassatis induta, ultro subtus passim pilis brevioribus subappressis glandulosis obsita, integra, ad marginem imprimis basin versus  $\pm$  revoluta, supra in sicco olivacea et opaca, subtus brunnescentia et nitidula, (2,5—)3—4 cm longa, 1—1,8 cm lata, costa supra leviter impressa, subtus prominente, nervis lateralibus basalibus utroque latere 1—2 alte ascendentibus, ceteris altius et pinnatim a costa abeuntibus irregularibus c. 4-paribus, curvatis, omnibus inter sese curvato-conjunctis, supra parum vel haud, subtus paullo elevatis, reticulatione densa, subtus tantum minute sed bene visibiliter prominula; petioli pubescentes, 1—2 mm longi. Racemi axillares, valde reducti, 2—3-flori, ad rhachem, pedicellos et calyces dense pilis hispidulis patentibus 0,5—1 mm longis laxiusque pilis aliis brevioribus subappressis glandulosis seu glandulis stipitatis ornati; rhachis c. 0,5 mm longa, basi perulis ovato-suborbicularibus paucis 2—3 mm longis instructa. Pedicelli graciles, 1—1,5 mm longi. Calycis tubus sub anthesi obtuse obconicus vel subcampanulato-semiglobosus, 2—2,5 mm longus, c. 3 mm diam., laciniis gradatim subulatis erecto-patentibus 5(—6) mm longis, basi 1 mm latis, etiam intus pilosis. Corolla elongato-urceolata, tota 10(—11) mm longa, in inferiore tertio latissima, c. 4 mm diam., superne per c. 4 mm constricta et 1,5—2 mm diam., carnosula, rubra, extus ad lineas verticales cum calycis laciniis alternantes laxa longepilosa et glandulosa, ceterum glabra, lobis obtusis reflexis c. 1 mm longis. Stamina 10, c. 5 mm longa; filamenta lineari-subulata, basi infima glabra, sursum omnino villosa; thecae oblongae, basi obtusae, 0,7 mm longae; tubuli cylindrici, glandulis stipitatis nonnullis ornati, 0,6 mm longi, poro rotundo terminali pollen demittentes. Discus hispidulus. Stylus inferne subdense subappresse longepilosus, c. 2 mm infra stigma epilosus et papillosus, c. 9 mm longus, post anthesin lobis corollae reflexis paullo exsertus.

NEW GUINEA. Northwestern part, Vogelkop Peninsula, Arfak Mts, Angi Gita Lake, 1800 m, *Kostermans 2110* (BO; L, type), in swampy forest, fl. Oct. 1948.

77. **V. insigne** (Koord.) J. J. S., Nova Guinea 12 (5), 1917, 533 in text; Sleum., Bot. Jahrb. 72, 1942, 240. — *Neojunghuhnia insignis* Koord., Nova Guinea 8 (1), 1909, 184, t. 48.

NEW GUINEA. Southwestern part, crest of Mt Resi, Oranje Mts, c. 500 m, *Versteeg 1704* (BO, type; K, L, U).

78. **V. malacothrix** Sleum., Bot. Jahrb. 72, 1942, 241.

NEW GUINEA. Southeastern part, Centr. Distr., Mafulu, 1700 m, *Brass 5365* (A, BO, L; NY, type, † in B).

79. **V. oreites** Sleum., Bot. Jahrb. 72, 1942, 239.

NEW GUINEA. Northwestern part, Oranje Mts, Lake Habbema, 3225—3345 m, *Brass 9053, 9150, 9270* (A, BM, BO; L, type; LAE); 11 km NE of Wilhelmina top, 3400 m, *Brass & Meijer Drees 9642*.

80. **V. timonioides** Wernh., Trans. Linn. Soc. ser. 2 Bot. 9, 1916, 93; Sleum., Bot. Jahrb. 72, 1942, 239.

NEW GUINEA. Southwestern part, Utakwa R. to Mt Carstensz, 1190 m, *B. Kloss s.n.* (BM, type).

81. **V. longisepalum** J. J. S., Med. Rijksherb. 25, 1915, 14; Nova Guinea 12 (5), 1917, 535; l. c. 1918, t. 223; Sleum., Bot. Jahrb. 72, 1942, 239.

NEW GUINEA. Southwestern part, Treub Mts, 2400 m, *Pulle 1068* (BO, type; L).

82. **V. imbricans** J. J. S., Med. Rijksherb. 25, 1915, 13; Nova Guinea 12 (5), 1917, 534; l. c. 1918, t. 122; Sleum., Bot. Jahrb. 72, 1942, 240.

NEW GUINEA. Southwestern part, Perameles Mts, 1100 m, *Pulle 559* (BO, type; K, L).

83. **V. hispidulissimum** Wernh., Trans. Linn. Soc. ser. 2 Bot. 9, 1916, 92; Sleum., Bot. Jahrb. 72, 1942, 241.

NEW GUINEA. Southwestern part, Utakwa R. to Mt Carstensz, 1675 m, *B. Kloss s.n.* (BM, type).

84. **V. cardiophorum** Sleum., Bot. Jahrb. 72, 1942, 240.

NEW GUINEA. Northwestern part, Bele R., 18 km NE of Lake Habbema, 2350 m, *Brass 11301* (A; L, type); 9 km NE of Lake Habbema, 2950 m, *Brass 10704*.

85. **V. spaniotrichum** Sleum., nov. spec. — Frutex epiphyticus? Ramuli gracillimi, bene ramosi, in partibus recentissimis pube hirsutula densa e pilis patentibus (0,5—1 mm) eglandulosis vel minute subclavato-glanduliferis induti, cito glabrati, in sicco nigrescentes, laxe foliati. Folia ovata usque sublanceolato-ovata, apice brevius vel longius caudato-acuminata, acuta, basi rotundata usque subcordata, subcoriacea, utrinque lucidula, supra omnino glabra, subtus ad costam et interdum etiam ad marginem -vix in facie- laxe longe hispidulo-pilosa, ultro subtus passim pilis glandulosis brevibus subappressis  $\pm$  caducis induta, integra, margine breviter revoluta, 2,5—3,5 cm longa, 1—1,5 cm lata, costa supra per totam longitudinem sulcata, subtus prominente, nervis lateralibus utroque latere e basi singulis alteque curvato-ascendentibus, cum nervis altius a costa abeuntibus pinnatis 3—4 minus distinctis anastomosantibus, supra obscuris, subtus minute elevatis, rete venularum subtus subinconspicuo; petioli diutius hirsutuli, 1—2 mm longi, c. 0,5 mm diam. Racemi axillares abbreviati,



laxi, (3—)4—6-flori, ad rhachem pedicellosque aequaliter pilis patentibus eglanduliferis pilisque subcapitato-glanduliferis (iis in ramulis similibus sed paullo brevioribus et laxioribus) subdense, ad calyces praecipue pilis densis subvillosulis eglanduliferis ornati; rhachis 0,5—1 cm longa, gracillima. Pedicelli gracillimi, 0,7—1 (—1,2) cm longi. Calycis tubus semiglobosus vel campanulatus, 2 mm longus et diam.; laciniae late subulatae, erecto-patentes, 4—5 mm longae, basi 1—1,5 mm latae, dorso glabrae, margine laxe pilosae et imprimis superne glandulis stipitatis sparse instructae. Corolla elongato-urceolata, carnosula, glabra, tota 8(—9) mm longa, inferne 2,5—3, infra orem 1,5 mm diam., probabiliter rubra, lobis obtusis reflexis 1 mm longis. Stamina 10, alternatim paullo inaequilonga; filamenta subulata, infima basi glabra, ceterum usque ad apicem villosula, 2,5—3 mm longa; theca late oblongae, cum tubulis c. 1 mm longae, leaves, basi obtusae, tubulis ipsis quam thecae subaequilatis vix 0,5 mm longis apice oblique truncatis, pariete postico in dentem brevem (vel interdum dentes duos) extenuato. Discus villosulus. Stylus epilosus, minutissime papillosus, c. 7 mm longus. Fructus ignotus.

NEW GUINEA. Western part, Wissel Lake region, bivouac XX to interbivouac Gelaiteranga, 1634 m, *Eyma* 4317 (BO; L, type), fl. 11-1-1939.

86. **V. subulisepalum** J. J. S., Med. Rijksherb. 25, 1915, 13; Nova Guinea 12 (5), 1917, 532; l. c. 1918, t. 221; Sleum., Bot. Jahrb. 72, 1942, 240.

NEW GUINEA. Southwestern part, Hellwig Mts, 1900 m, *Pulle* 838 (BO, type; K, L).

87. **V. eymae** Sleum., nov. spec. — Fruticulus epiphyticus?. Ramuli gracillimi, apicibus subdense subpatenter longepilosi, 1—1,5 mm diam., sat laxe foliati. Folia lanceolato-ovata, apice caudato-acuminata, acuta, basi rotundata, glandulis basalibus 2 minutis distinctis ornata, subcoriacea, in sicco supra dilute cinereo-olivacea, subtus brunnescentia, supra maturitate glabra, subtus ad inferiorem mediam partem costae longe hispidulo-pilosa, ultra subtus passim pilis brevioribus subappressis brunneis glandulosis adspersa, integra, margine in sicco  $\pm$  revoluta, 3—5 cm longa, 1—1,6 cm lata, costae supra leviter impressa, subtus prominula, nervis lateralibus basalibus et subbasalibus utroque latere 2, aliis altius a costa abeuntibus irregularibus 3—5, omnibus alte ascendentibus interque sese ante marginem conjunctis supra levissime insculptis, subtus prominulis, rete venarum venularumque supra subobscuris, subtus dense laeteque prominulis; petioli pilosi vel cito subglabri, 2—3 mm longi, c. 1 mm crassi. Racemi axillares subsessiles laxi, 5—8-flori, interdum ad fasciculos 3—4-floros reducti, ad rhachem, pedicellos et calyces dense pilis mollibus patentibus (0,5 mm) vestiti, basi pluribracteati, bracteis vel perulis minutis glabris; rhachis gracilis, usque ad 1 cm longa. Pedicelli graciles, 0,8—1,3 cm longi. Calycis tubus obconicus vel subcampanulatus, 2,5—3 mm longus et diam.; laciniae subulatae, extus ad basin et costam dorsalem pilis longioribus, superne et intus pilis multo brevioribus indutae, 6—7 mm longae, basi  $\pm$  1 mm latae, acutae. Corolla elongato-urceolata, carnosula, colore haud cognita, tota 11—12 mm longa, inferne c. 3, apice vix 2 mm diam., extus glabra, lobis obtusis reflexis 1 mm longis. Stamina 10, c. 5 mm longa; filamenta subulata, 3 mm longa, ad imam basin glabra, superne per c. 1,5 mm villosa, ceterum iterum glabra; thecae, oblongae, basi obtusae, 1,3 mm longae; tubuli thecis fere aequilati, 0,9 mm longae, apice

oblique abscissi, pariete postico in dentem (vel interdum in dentes duos) protracti. Discus elevatus, pubescens. Stylus apice puberulo excepto subappresse pilosulus.

NEW GUINEA. Western part, Wissel Lake region, Dejatej, 1750 m, *Eyma* 5194 (BO, type), fl. 8-9-1939.

6. Sect. **Bracteata** Nakai, Tr. Shr. Japan ed. 2, 1927, 241; Sleum., Bot. Jahrb. 71, 1941, 420, 467; l. c. 72, 1942, 265.

Type species: *V. bracteatum* Thunb.

Sect. *Bracteata* is based on the  $\pm$  foliaceous bract, which subtends each flower and persists at least for some time during the anthesis, and in general does still during the fruiting stage. This character, distinct in the proper species of the section, is represented in a lessened way in some species of Sect. *Nesococcus*, which have small, rather tardily caducous bracts, and for that reason are included in the key.

### Key to the species

- 1.a. Leaves manifestly cren(ul)ate or cren(ul)ate-serrate all over the margin . . . 2
- b. Leaves entire or practically so (faint crenulations or subimpressed marginal glands mostly restricted to the lower half of the lamina) . . . 9
- 2.a. Leaves acuminate at the apex . . . 3
- b. Leaves (crenate or crenulate) obtusely attenuate to rounded at the apex . . . 4
- 3.a. Leaves chartaceous to subcoriaceous at maturity, crenulate-serrate, the apex ending with a sharp point. Tubules  $\pm$  double as long as the thecae. *SE. Asia, Sumatra, Banka, Billiton, Lingga Arch., Malay Peninsula, Karimun Isl., Karimata Arch.*  
88. *V. bracteatum*
- b. Leaves coriaceous at maturity, remotely impressedly crenulate, the very apex bluntish. Tubules  $\pm$  as long as the thecae. *Celebes* . . . 89. *V. kjellbergii*
- 4.a. Calyx lobes with a distinct callose apical gland (marginal glands not present) . . . 5
- b. Calyx lobes not callose-thickened at the apex, whether or not provided with a row of rather numerous marginal sessile glands . . . 7
- 5.a. Leaves oblong or elliptic-oblong, sometimes lanceolate or subobovate-oblong, crenulate by a few remote depressed glands. *S. Celebes, Sumba, Flores, Alor, Timor*  
90. *V. timorense*
- b. Leaves oblong- to elliptic-obovate, rather deeply and much more densely subserrate-crenate . . . 6
- 6.a. Leaves 1,4—1,9 by (0,5—)0,6—0,8 cm. *Celebes*  
91. *V. centrocelebicum* var. *centrocelebicum*
- b. Leaves 1,5—2 by 1—1,3 cm. *Celebes* . . . 91. *V. centrocelebicum* var. *maius*
- 7.a. Calyx lobes provided with a row of rather numerous sessile marginal glands. *Borneo*  
156. *V. coriaceum*
- b. Calyx lobes without any apical or marginal glands . . . 8
- 8.a. Bracteoles leafy, persistent, as long as or longer than the pedicels and inserted in their middle. *New Hebrides, New Caledonia* . . . 92. *V. macgillivrayi*
- b. Bracteoles very small and very early caducous (not more present in flowering time). *Mindanao* . . . 93. *V. gitingense*
- 9.a. Leaves initially hairy all over the upper and/or undersurface, very tardily glabrescent . . . 10
- b. Leaves glabrous or practically so from the begin (some puberulence may be found underneath at the base) . . . 16
- 10.a. Corolla laxly to densely pubescent . . . 11
- b. Corolla glabrous . . . 15
- 11.a. Corolla  $\pm$  1,5 cm. Stamens at least 1 cm. *Luzon* . . . 94. *V. indutum*
- b. Corolla up to 1,1 cm. Stamens up to 5,5 mm . . . 12
- 12.a. Corolla ampullaceous, 1—1,1 cm. *New Guinea* . . . 95. *V. ampullaceum*
- b. Corolla (sub)cylindric, cylindric-urceolate or narrow-campanulate, up to 7,5 mm . . . 13
- 13.a. Corolla 7—7,5 mm. Anthers provided with 2 dorsal spurs. Style hairy. *Malay Peninsula* . . . 96. *V. glabrescens*

- b. Corolla 4—4,5 mm. Anthers not spurred. Style glabrous . . . . . 14
- 14.a. Leaves elliptic, apex obtuse to rounded. *Mindanao* . . . . . 97. *V. trichocarpum*  
 b. Leaves ovate or ovate-oblong, apex shortly acuminate. *New Guinea* . . . . . 163. *V. mollissimum*
- 15.a. Leaves ovate to oblong-ovate, base slightly cordate. *New Guinea* . . . . . 98. *V. wisselianum*  
 b. Leaves elliptic to oblong, sometimes subovate- or subobovate-oblong, base sub-truncate-rounded or broadly attenuate. *Sumatra* . . . . . 112. *V. korinchense* var. *korinchense*
- 16.a. Calyx lobes (all or in part) provided with a distinct, thickened or callose apical gland (marginal glands not present) . . . . . 17  
 b. Calyx lobes not callose-thickened at the apex, whether or not provided with a row of sessile marginal glands . . . . . 22
- 17.a. Calyx lobes distinct, 1—1,5 mm . . . . . 18  
 b. Calyx limb low (0,5 mm), wavy, hardly or not properly lobed (the lobes often merely indicated by a gland) . . . . . 21
- 18.a. Corolla subglobose-urceolate, apex much contracted, densely hairy outside. *New Guinea* . . . . . 99. *V. thibaudifolium*  
 b. Corolla (sub)cylindric-urceolate, subdensely glandular-muriculate or glabrous outside . . . . . 19
- 19.a. Corolla subdensely glandular-muriculate outside. *New Guinea* . . . . . 109. *V. papuanum*  
 b. Corolla glabrous outside . . . . . 20
- 20.a. Leaves oblong or elliptic-oblong, sometimes lanceolate or subobovate-oblong. Style laxly hairy in the lower third, glabrous for the rest,  $\pm$  6 mm. *S. Celebes, Sumba, Flores, Alor, Timor* . . . . . 90. *V. timorense*  
 b. Leaves ovate to oblong-ovate, or broad-elliptic. Style quite glabrous, c. 3 mm. *N. Celebes (Minahasa), Philippines, Moluccas (Tidore)* . . . . . 113. *V. myrtoideis*
- 21.a. Calyx glabrous. *New Guinea* . . . . . 194. *V. fraternum*  
 b. Calyx glandular-muriculate and short-pubescent. *New Guinea* . . . . . 171. *V. amphoterum*
- 22.a. Calyx lobes provided with a row of sessile yellowish marginal glands. *Borneo* . . . . . 157. *V. stapfianum*  
 b. Calyx lobes without any glands at all . . . . . 23
- 23.a. Tubules longer than the thecae, or if as long as, then much narrower than the thecae . . . . . 24  
 b. Tubules shorter than the thecae, or if as long as, then  $\pm$  as wide as the thecae . . . . . 30
- 24.a. Corolla at least 9 mm, generally much longer . . . . . 25  
 b. Corolla 5—6 (rarely up to 7) mm long . . . . . 29
- 25.a. Corolla exclusively and properly hairy. *Luzon* . . . . . 94. *V. indutum*  
 b. Corolla laxly to subdensely glandular-muriculate, furthermore whether or not finely short-pubescent . . . . . 26
- 26.a. Leaves subcoriaceous, flexible. Style laxly hairy in the lower half. *Mindanao* . . . . . 100. *V. epiphyticum*  
 b. Leaves coriaceous, firm. Style quite glabrous . . . . . 27
- 27.a. Leaves broadly elliptic-ovate, 5,5—7 cm wide. Rhachis and pedicels quite glabrous. (Disk puberulous.) *Mindoro* . . . . . 101. *V. barandanum* var. *hutchinsonii*  
 b. Leaves lanceolate, ovate-lanceolate or ovate-elliptic or -oblong, (2,5—)3,5—4,5 (—5,5) cm wide. Rhachis and pedicels minutely pubescent and/or laxly glandular-muriculate . . . . . 28
- 28.a. Disk glabrous. *Luzon* . . . . . 101. *V. barandanum* var. *barandanum*  
 b. Disk pubescent. *Luzon* . . . . . 101. *V. barandanum* var. *cagayanense*
- 29.a. Tubules  $\pm$  double as long as the thecae. *SE. Asia, Sumatra, Banka, Billiton, Lingga Arch., Malay Peninsula, Karimun Isl., Karimata Arch.* . . . . . 88. *V. bracteatum*  
 b. Tubules  $\pm$  as long as the thecae. *Celebes* . . . . . 89. *V. kjellbergii*
- 30.a. Anthers with 2 distinct (shorter or longer) dorsal spurs . . . . . 31  
 b. Anthers without any trace of dorsal spurs . . . . . 36
- 31.a. Leaves 0,8—1,5 by (0,4—)0,5—0,8(—1) cm. *Malay Peninsula* . . . . . 102. *V. scortechinii*  
 b. Leaves much larger . . . . . 32
- 32.a. Leaves  $\pm$  broadly attenuate or subacuminate at the apex. Corolla at least 7 mm. *Sumatra* . . . . . 117. *V. varingiaefolium* var. *calcaratum*  
 b. Leaves distinctly acuminate to subcaudate at the apex. Corolla up to 6 mm . . . . . 33



- 33.a. Corolla (densely hairy outside) subglobose-urceolate, apex much contracted (3,5—4 mm). *New Guinea* . . . . . 99. *V. thibaudifolium*  
 b. Corolla tubular- to broad-urceolate (4—6 mm) . . . . . 34
- 34.a. Corolla puberulous outside (2,5—3 mm in diam.). Tubules obliquely cut distally, the pore oval. *Mindanao* . . . . . 103. *V. agusanense*  
 b. Corolla glabrous outside. Tubules transversely cut at the apex, the pore round 35
- 35.a. Corolla 5—6 by 4—4,5 mm. *Luzon* . . . . . 104. *V. philippinense*  
 b. Corolla 4 by 2—2,5 mm. *Celebes* . . . . . 105. *V. dubiosum*
- 36.a. Posticous wall of each tubule ending in 2 distinct teeth . . . . . 37  
 b. Posticous wall of each tubule ending in one  $\pm$  broad tooth, or obtuse at all . 40
- 37.a. Leaves 8—11 by 2,5—4 cm. Corolla 8—10 mm. *New Guinea*  
 106. *V. grandibracteatum*  
 b. Leaves up to 7 by 3 cm . . . . . 38
- 38.a. Leaves (1—)1,2—1,7 by (0,5—)0,6—0,8 cm. *New Guinea* . . . . . 107. *V. dominans*  
 b. Leaves larger . . . . . 39
- 39.a. Leaves 4,5—5,5 by 2—3 cm. Corolla glabrous. Calyx lobes with a tuft of hairs at the apex. *New Guinea* . . . . . 108. *V. montis-ericae*  
 b. Leaves (2,4—)4—6(—7) by (1—)2—2,5(—3) cm. Corolla subdensely set with muriculate glands and sometimes furthermore sparsely with a very fine puberulence. Calyx lobes not barbate at the apex. *New Guinea* . . . . . 109. *V. papuanum*
- 40.a. Leaves (6—)7—14 by (3—)3,5—5(—7) cm. *Luzon* . . . . . 110. *V. platyphyllum*  
 b. Leaves much smaller in general . . . . . 41
- 41.a. Flowers sessile or very shortly pedicellate (up to 2 mm in anthesis, slightly longer in fruit) . . . . . 42  
 b. Flowers pedicellate (at least 3 mm in anthesis) . . . . . 45
- 42.a. Corolla all over persistently short-pubescent. *Sumatra* . . . . . 111. *V. miquelii* var. *atjehense*  
 b. Corolla glabrous, or caducously hairy at the apex initially . . . . . 43
- 43.a. Calyx lobes obtuse. (Corolla urceolate, (5—)6(—7) by 2,5—3 mm. Leaves (very) densely arranged, 1—1,5(—2) by (0,4—)0,5—0,8 cm.) *Sumatra*  
 111. *V. miquelii* var. *miquelii*  
 b. Calyx lobes acute or subacute . . . . . 44
- 44.a. Leaves dense, (0,8—)1—1,5 by (0,4—)0,5—0,6(—0,7) cm. Corolla subovoid-cylindric or ampullaceous,  $\pm$  abruptly narrowed in the upper third, 6 by 2—2,5 mm (below). *Sumatra* . . . . . 112. *V. korinchense* var. *losirensae*  
 b. Leaves laxly to subdensely arranged, (1,2—)1,8—3,5(—4) by (0,8—)1—1,5 (sometimes up to 2) cm. Corolla narrow-urceolate, (5—)6—8(—10) by (2—)3 mm. *Sumatra*  
 112. *V. korinchense* var. *korinchense*
- 45.a. Corolla 4(—4,5) mm (shortly cylindric-urceolate). Style c. 3 mm. *N. Celebes (Minahasa), Philippines, Moluccas (Tidore)* . . . . . 113. *V. myrtoides*  
 b. Corolla at least 7 mm. Style at least 6 mm . . . . . 46
- 46.a. Corolla elongate-urceolate or ampullaceous, gradually or mostly subabruptly narrowed in the upper half, membranous. Branchlets slender . . . . . 47  
 b. Corolla urceolate-cylindric, gradually or hardly narrowed towards the apex, fleshy. Branchlets stoutish . . . . . 50
- 47.a. Leaves (4—)4,5—5,5(—7) by (1,8—)2—3 cm (subovate- or lanceolate-, sometimes oblong-elliptic, shortly subcaudate-acuminate) *New Guinea*  
 114. *V. glandellatum*  
 b. Leaves up to 2,5 by 1,2 cm . . . . . 48
- 48.a. Leaves ovate, coriaceous, 0,6—1(—1,2) by (0,4—)0,5—0,8 cm. *Celebes*  
 115. *V. paludicolum*  
 b. Leaves oblong-elliptic to obovate, thin-coriaceous, (1—)1,5—2,5 by 0,6—1,2 cm 49
- 49.a. Corolla glabrous. *Sumatra, Java, Bali, Lombok, W. Flores, Celebes*  
 116. *V. lucidum* var. *lucidum*  
 b. Corolla all over subdensely pubescent. *Sumatra* 116. *V. lucidum* var. *roseitinctum*
- 50.a. Leaves laxly to subdensely arranged, with 5—8 pairs of nerves, ovate to obovate or rhombic, rarely more lanceolate-elliptic, variable in shape and size, in general larger than 2 by 1 cm. Branchlets glabrous or pubescent. *Sumatra, Malay Peninsula, Java, Bali* . . . . . 117. *V. varingiaefolium* var. *varingiaefolium*  
 b. Leaves densely to subimbricately arranged,  $\pm$  elliptic, with 3—4 pairs of nerves,

the reticulation mostly more distinctly visible, 1—1.5(—2) by 0.5—1 cm. Branchlets  $\pm$  densely hairy to subtomentellous. *C. & E. Java*

117. *V. varingiaefolium* var. *orientale*

88. *V. bracteatum* Thunb., Fl. Jap. 1784, 156; G. Don, Gen. Syst. 3, 1834, 854; Dun. in DC., Prodr. 7, 1839, 573; Miq., Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 29; l. c. 2, 1865, 160; Dop in Fl. Gén. I.-C. 3, 1930, 710; Fletcher in Fl. Siam. En. 2, 1938, 312; Sleum., Bot. Jahrb. 71, 1941, 470 (with complete synonymy); Steen., Act. Hort. Berg. 15 (2), 1949, 40, fig. 1 (distr. map); Makino, Ill. Fl. Japan, 1954, 240, fig. — *V. malaccense* Wight, Calc. J. Nat. Hist. 8, 1847, 172; Ic. Pl. 4, 1848, t. 1186 (*V. 'malacca'*); Miq., Fl. Ind. Bat. Suppl. 1, 1860, 251; Kurz, Nat. Tijd. N. I. 27, 1864, 215; Scheff., l. c. 31, 1870, 363; Clarke in Hook. f., Fl. Br. Ind. 3, 1882, 454; Ridl., J. Str. Br. R. As. Soc. 23, 1891, 146; Trans. Linn. Soc. ser. 2 Bot. 3, 1893, 315; J. Str. Br. R. As. Soc. 33, 1900, 103; K. & G., J. As. Soc. Beng. 74, ii, 1905, 67; Koord., Exk. Fl. Java 3, 1912, 19; Ridl., J. Fed. Mal. St. Mus. 7, 1916, 45; Fl. Mal. Pen. 2, 1923, 211; Heyne, Nutt. Fl. ed. 2, 1927, 1218; Rehd., J. Arn. Arb. 15, 1934, 285; Burk., Dict. 1935, 2217; Corner, Ways. Trees, 1940, 219, f. 59; Amsh. in Back., Bekn. Fl. Java (em. ed.) 7, 1948, fam. 163, p. 3; Henders., Mal. Nat. J. 6, 1950, 259. — *V. malaccense* Wight var. *banca-num* Miq., Fl. Ind. Bat. Suppl. 1, 1860, 587; Ann. Mus. Bot. Lugd.-Bat. 1, 1864, 221; Kurz, Nat. Tijd. N. I. 27, 1864, 215. — *V. pubicarpum* Ridl., J. Linn. Soc. Bot. 38, 1908, 313, repr. in J. Fed. Mal. St. Mus. 2, 1908, 119; l. c. 6, 1915, 156; Fl. Mal. Pen. 2, 1923, 211.

SUMATRA. Riou w, Indragiri Highlands, Bt. Tjengkeëmbun, c. 300 m, *Buwalda* 7066. Palembang, N slope of G. Pesagi, c. 1800 m, *Van Steenis* 3692.

BANKA. Lobok Besar, 10—20 m, *Kostermans & Anta* 166, 304. Pangkalpinang, *Van der Vecht* 2. Muntok, *Teysmann s.n.* (BO, GH; U, type of *V. malaccense* var. *banca-num*); *Bünnemeijer* 1474; *Kurz (Amann)* 34. Djebus, *Teysmann s.n.* (BO). Sg. Liat, *Bünnemeijer* 1933. Locality not given, *Horsfield* 10; *Teysmann H.B.* 3377; *Berkhout s.n.*; *Kobus s.n.*

BILLITON. Manggar, *Ham* 16. Tandjung Pandan, *Teysmann* 11007. Locality not given, *Vorderman s.n.*; *Riedel s.n.*

LINGGA ARCH. P. Sebangka, 30 m, *Bünnemeijer* 7479.

MALAY PENINSULA. K e d a h, Kedah Peak, 760—1220 m, *Vesterdal* 174; *Lobb s.n.*; *Robinson & Kloss F.M.S. Herb.* 13006; *Haniff & Nur SF* 4750; *Spare SF* 36307; *For. Dep. F.M.S.* 46871 *Symington*. Dindings, Lumut, *Ridley & Curtis (Ridley)* 3605). Kelantan, *For. Dep. F.M.S.* 38363 *Awang*. Trengganu, Dungun-Merchang road, *Sinclair & Kiah SF* 39911; Bt. Tok Beng, *Holtum SF* 15247; Chukai, Kemaman, *Corner s.n.*; Kuala Trengganu, *Vesterdal* 134. Pahang, near Pekan, *Ridley* 625, 1025, 1110; Rompin, *For. Dep. F.M.S.* 14996, 17144 *Mahamud*; *KEP* 79187 *Wyatt-Smith*; Sg. Chenai, *Fox (Herb. Ridley)* 5024; Kluang Terbang, *Barnes (Ridley)* 10867; Kuantan, *For. Dep. F.M.S.* 15109 *Sow*; *For. Dep. F.M.S.* 20222 *Struggnell*; *ibid.*, Kemaman road, *KEP* 76591 *Wyatt-Smith*; Tana Wakop, *C.F.* 3114 *Yeob*; Tanjong Tembeling, *For. Dep. F.M.S.* 37348 *Symington*; G. Tahan, 1525—1830 m, *Wray & Robinson* 5443 (BM; K, type of *V. pubicarpum*); *Ridley* 16051. Malacca, Tanjong Kling, *Ridley* 3177; T. Kundur, *Griffith anno* 1845 (K, type of *V. malaccense*); Merlimau, *Cantley s.n.*; locality not given, *Maingay* 1326 (= *Kew Distr.* 698); *Christ. Smith anno* 1796 (BM). Langkawi, *Haniff SF* 1051. P. Penang, *Ridley s.n.* (K). Singapore, *Ridley s.n.*; *R. Schomburgk* 77; *ibid.*, Changi, *Sinclair SF* 40018.

JAVA. Karimun Isl., G. Bandera, top, 250 m, *Dammerman* 11. 'Prope Karimon', *Teysmann s.n.*

BORNEO. Karimata Isl., P. Serutu, *Mondi* 159.

89. *V. kjellbergii* J. J. S., Bot. Jahrb. 68, 1937, 211. — *V. malaccense* Wight var. *celebense* J. J. S., Bull. Jard. Bot. Butz II, 8, 1912, 48.

CELEBES. Central part, Malili, Lampea, seashore, *Kjellberg 2068* (BO; S, type of *V. kjellbergii*). Southeastern part, Rumbia, Sawakunda R., 150—500 m, *Elbert 3121*. Kabaena Isl., Mt Sangia Wita, 600—900 m, *Gründler 3456, 3463, 3480* (BO, lectotype of *V. malaccense* var. *celebense*; K, L).

90. *V. timorense* Fawc. in Forbes, Wand. 1885, App. 6, p. 509, incl. var. *denticulatum* Fawc., l. c. — *V. cf. varingiaefolium* (Bl.) Miq. ap. Meijer Drees, Comm. nr. 33 For. Res. Inst. Bogor, 1951, 49.

TIMOR. Eastern part, foot of Mt Tahaolat, S of Dilli, 1525 m, *Forbes 3586* (BM, BO); *ibid.*, Fatunaba hills, 520—760 m, *Forbes 3423* (A; BM, lectotype of *V. timorense*; BO), 3447 (BM, type of *V. timorense* var. *denticulatum*; BO); Mt Tatamailau, 2600—2950 m, *Van Steenis 18446*. Central part, Mt Lakan (Lekaen), c. 2000 m, *Ten Kate s.n.* Western part, G. Mutis, 1750—2365 m, *De Voogd 2276; Walsh 418; ibid.*, Nenas, 1600 m, *F.R.I. bb. 11802* (*V. 'varingiaefolium'*).

ALOR. Central Highland, Pido-Woisika, 1000 m, *Jaag 1351; Bouwman-Houtman 123*. Mt Kojakaja, top, 1600 m, *Jaag 1088*.

FLORES. Central part, G. Geli Mutu, 1500—1800 m, *Horst 5; De Voogd 1805, 1828, 2006, 2007, 2801, 2811; Posthumus 3033; Rensch 1492; Jaag 1512*.

SUMBA. Eastern part, Lairondja and vicinity, 950—1000 m, *Grevenstuk 3, 87, 88; Kananggar, Iboet 510*; no locality given, c. 800 m, *De Voogd 1883*.

CELEBES. Southern part, Gowa, Lambaja, 1600 m, *F.R.I. bb. 20225; ibid.*, top Lompobatang, 2700—2850 m, *Van Zijl de Jong 5*.

Similar in leaves, flowers not seen, the short fructifications with subsistent bracts, calyx lobes with an apical gland, perhaps related to *V. timorense*:

NEW GUINEA. Southeastern part, Milne Bay Distr., Rossel Isl., Mt Rossel, S slopes, 700 m, *Brass 28422* (A, L), canopy tree, 5—6 m, in scrubby low ridge crest forest at 700 m, fr. 15-10-1956.

91. *V. centrocelebicum* Sleum., nov. spec.

var. *centrocelebicum*.

Frutex. Ramuli angulati, in sicco atropurpurei, glabri, sat dense foliati. Folia oblongo- usque elliptico-obovata, apicem versus late attenuata, apice subobtusa glandulaque minuta terminata, basi cuneata paulloque in petiolum decurrentia, tenuiter coriacea, glabra, subtus laxè punctata, in sicco supra olivaceo-viridia, subtus brunnea, opaca, margine regulariter subserrato-crenata (crenaturis glandula terminatis, 1—2 mm distantibus, c. 0,3 mm altis), 1,4—1,9 cm longa, (0,5—)0,6—0,8 cm lata, nervis lateralibus 4—5-paribus praerupte ascendentibus utrinque cum costa prominulis, reticulatione supra indistincta, subtus subinconspicua; petioli 1(—2) mm longi, 0,5—1 mm diam. Racemi axillares, corolla excepta puberuli, 10—15-flori; rhachis gracilis, angulata, 3—4(—6) cm longa. Pedicelli graciles, 4—7 mm longi, basi bractea foliacea c. 7 mm longa et 2—3 mm lata, post anthesin caduca suffulti. Calycis tubus cupulato-campanulatus, 1,5 mm longus, c. 2 mm altus, basi rotundato-obtus, limbus patens, lobis ovato-deltoidis, 1 mm longis, callosio-apiculatis. Corolla tubulosa, 5 mm longa, c. 2,5 mm diam., alba, extus glabra, intus ubique brevissime pubescens, lobis obtusis reflexis 0,8 mm longis. Stamina 10, c. 3 mm longa; filamenta subulata, usque ad apicem pilosa, c. 2 mm longa; thecae late oblongae, dorso manifeste bicalcaratae, 0,9 mm longae; tubuli late cylindrici, thecis paullo angustiores, 0,5 mm longi. Discus laxè pubescens. Stylus gracilis, glaber, c. 4,5 mm longus, sub anthesi paullo exsertus. Bacca non visa.

CELEBES. Central part, Enrekang, between Pintéalón, Pokapindjang and Tinábang, ridge, 2600—3000 m, *Eyma 586* (A, BO, K; L, type), fl. 16-6-1937.



var. **maius** Sleum., nov. var. — A typo foliis latioribus magis obovatis vel rhombo-ellipticis, 1,5—2 cm longis, 1—1,3 cm latis, subtus distinctius nervosis diversum. Bacca subglobosa, fere matura c. 4 mm diam.

CELEBES. Central part, Masamba, Tedeboë, c. 2400 m, *F.R.I. bb.* 26640 (BO; L, type), fr. 24-11-1938, rare, said to be a tree up to 30 m, trunk c. 28 cm diam.

92. **V. macgillivrayi** Seem., *J. Bot.* 2, 1864, 77; *Fl. Vit.* 1866, 146; Skotts., *Act. Hort. Gotob.* 8, 1933, 97, f. 54—65; Guillaum., *Bull. Soc. Bot. Fr.* 82, 1935, 350; l. c. 90, 1943, 160.

NEW HEBRIDES. Aneityum, 50 m, *Macgillivray* 925 (K, type); *Kajewski* 701. Eromanga, 300 m, *Kajewski* 301; *Cumming s.n.*; *Turner s.n.*; *Aubert de la Rue s.n.* Anatom, *Aubert de la Rue s.n.* Tanna, *Aubert de la Rue s.n.*

NEW CALEDONIA. Diaoué, *Vieillard* 827 (CN, not seen).

93. **V. gitingense** Elm., *Leaf. Philip. Bot.* 4, 1912, 1490; Merr., *En. Philip.* 3, 1923, 249; Copel. f., *Philip. J. Sc.* 42 (4), 1930, 559, pl. 1, f. 6—8.

PHILIPPINES. Sibuyan, Capiz prov., Mt Giting-giting, *Elmer* 12555 (A, BM, BO; DS, cit. Copel. f., not seen; FI, G, GH, K, L, P; PNH, type, †; US, cit. Copel. f., not seen). Mindanao, Surigao prov., Tubungan Dayan, *F.B.* 26005 *Mallonga* (US, cit. Copel. f., not seen); Iron Deposit, *B.S.* 34577, 34591 *Ramos & Pascasio*; *B.S.* 34262 (partly distrib. sub 34626) *Ramos & Pascasio*. Dinagat Isl., *B.S.* 84103 *Ramos & Convocar*.

94. **V. indutum** Vid., *Rev. Pl. Vasc. Filip.* 1886, 169; Merr., *Philip. J. Sc.* 3, 1908, Bot. 376; l. c. 7, 1912, Bot. 96; *En. Philip.* 3, 1923, 249; Copel. f., *Philip. J. Sc.* 42 (4), 1930, 553, pl. 2, f. 1—3. — *V. macgregorii* Merr., *Philip. J. Sc.* 10, 1915, Bot. 53; *En. Philip.* 3, 1923, 250 — *V. sorsogonense* Elm., *Leaf. Philip. Bot.* 10, 1939, 3730.

PHILIPPINES. Luzon, Mountain prov., *Vidal* 1831 (K, type of *V. indutum*; L, MA). Lepanto subprov., Malamey, *Vanoverbergh* 1013. Bontoc subprov., no precise locality given, *Vanoverbergh* 1875 (P); Mt Caua, *B.S.* 38018 *Ramos & Edano*. Ifugao subprov., *McGregor* 1347; Mt Polis, *B.S.* 19846 *McGregor* (BM, K, P; PNH, type of *V. macgregorii*, †; P; US, cit. Copel. f., not seen); *ibid.*, *B.S.* 37686 *Ramos & Edano*. Sorsogon prov., *Elmer* 16912, 17026 (BM, BO, FI, K, L, NY; PNH, type of *V. sorsogon.*, †; UC and US, cit. Copel. f., not seen).

95. **V. ampullaceum** Sleum., *Bot. Jahrb.* 72, 1942, 266.

NEW GUINEA. Eastern part, Centr. Distr., Alola, 1890 m, *Carr* 13650 (A, BM, K; L, type; NY, SING); Mt Musgrave, *McGregor anno 1889* (MEL); Mt Yule, *McGregor anno 1890* (MEL). Eastern Highlands, above Goroka, Leahey's logging area, 2530 m, *N.G.F.* 6130 *Womersley & Floyd* (differing by the back wall of the tubules which is hardly extenuate into a tooth).

96. **V. glabrescens** K. & G., *J. As. Soc. Beng.* 74, ii, 1905, 63; Ridl., *Fl. Mal. Pen.* 2, 1923, 208. — *V. longibracteatum* Ridl., *J. Linn. Soc. Bot.* 38, 1908, 313, repr. *J. Fed. Mal. St. Mus.* 2, 1908, 119; l. c. 6, 1915, 49, 156; *Fl. Mal. Pen.* 2, 1923, 208; Henders., *J. Fed. Mal. St. Mus.* 13, 1927, 5.

MALAY PENINSULA. Perak, G. Kerbau, 1525—1675 m, *Robinson s.n.*; *KEP* 31430, 31491, 32112, 32128 *Symington*; G. Raya, 1740 m, *For. Dep. F.M.S.* 45874 *Strugnell & Tachun*; locality not given, *Scortechini s.n.* (CAL, type of *V. glabrescens*, not seen). Pahang, G. Benom, 1525—1645 m, *F.M.S. Mus. coll. s.n.*; *For. Dep. F.M.S.* 22315 *Strugnell*. G. Padang, *For. Dep. F.M.S.* 42855 *Sow*; G. Ulu Kechau, 1830 m, *For. Dep. F.M.S.* 42916 *Strugnell & Sow*; G. Tahan, 1000—1830 m, *Corner s.n.*; *Wray & Robinson* 5326 (BM; K, type of *V. longibracteatum*; SING); *Holtum* SF 20731; *F.M.S.*

*Mus.* 12233 *B. Kloss*; *Seimund* 487; *Haniff & Nur* SF 7870; *ibid.*, summit, 2165 m, *F. M. S.* 8221 *Woolley*; *Wrays Hill*, *Ridley* 16050, 16232. *Pahang/Selangor*, *G. Ulu Kali*, 1830—2080 m, *KEP* 78804 *Wyatt-Smith*; *Burn Murdoch* 336, 347. *Selangor*, *G. Moyang*, 1830 m, *KEP* 56678 *Symington*. *Kelantan*, *G. Stong (Sitong)*, summit, *For. Dep. F. M. S.* 37678, 37694 *Symington*; *Foxworthy & Nur* SF 12206.

97. *V. trichocarpum* Sleum., nov. spec. Arbuscula, 2—4 m alta. Ramuli graciles usque gracillimi, in partibus recentissimis patenter hirsutuli, ceterum cito omnino glabrati, sat dense vel laxius foliati. Folia elliptica, apice rotundato-obtusa, interdum levissime emarginata, glandula apicali subnulla, basi late attenuata vel subrotundata, glandulis 2 marginalibus subbasalibus minutis a petiolo valde remotis instructa, novella membranacea et praecipue subtus ad costam et ad petiolum hirsutula, subtus in facie brevius pilosa, ciliata, supra glabra, matura subcoriacea pilisque in costa subtus diutius persistentibus exceptis glabra, opaca, in sicco supra saturate cinerascens-brunnea, subtus clarius brunnescentia, integra, 2—2,8 cm longa, 0,8—1,3 cm lata, costa supra leviter impressa, subtus prominente, nervis lateralibus  $\pm$  pinnatis utroque latere 4—5 parum distinctis, reticulatione laxa subobscura; petioli sat graciles, 1,5—2 mm longi. Racemi axillares et subterminales, breves, laxe remoteque 2—4-flori; rhachis gracilis, sicut ramuli, pedicelli et calyces dense patenter molliter hirsutula, 1—3(—4) cm longa, sub anthesi accrescens, flores in superiore parte tantum gerens. Pedicelli sub anthesi c. 0,5, sub fructu usque ad 2 mm longi, basi bractea persistenti foliacea ovata usque ovato-elliptica, initio membranacea denseque pubescente, sub fructu subchartacea, glabrescente, usque ad 1 cm longa et 0,9 cm lata suffulti; bracteolae subulatae, c. 1,5 mm longae, citissime caducae. Calycis tubus subcylindricus, c. 2 mm longus, limbus erecto-patens, 1 mm altus, usque ad medium 5-lobus, lobis deltoideis obtusis interdum glandula subcrassa apicali pilis  $\pm$  oblecta instructis. Corolla cylindrico-urceolata, rosacea, extus laxe longepilosa, intus glabra, c. 4 mm longa, 2 mm diam., breviter 5-loba. Stamina 10, c. 3 mm longa; filamenta late linearia, laxe breviter pubescentia, 1 mm longa; thecae anguste oblongae, 1,2 mm longae, ecalcaratae; tubuli cylindrici, erecti, thecis duplo angustiores, parum divergentes, c. 1 mm longi, poro introrso elongato pollen demittentes. Discus glaber. Stylus sat crassus, glaber, corollam subaequans. Bacca globosa, apice truncata lobisque calycis inflexis coronata, submatura c. 5 mm diam., subdense hirsutula.

PHILIPPINES. *Mindanao*, *Agusan prov.*, *Mt Hilong-Hilong*, *Cabadbaran*, peak of *Mt Malampayan*, 1316 m, *PNH* 10778 *Mendoza & Convocar* (L, type), fl. 20-4-1949. *Davao prov.*, summit of *Mt Mayo*, 1738 m, *PNH* 11353 *Edano* (A), fr. 4-4-1949.

Note: *PNH* 11353 *Edano* was distributed under the name *V. trichocarpum* 'Merr. & Quisumbing' which has never been published.

98. *V. wisselianum* Sleum., nov. spec. — Frutex 1—2,5 m altus. Rami teretes, robusti. Ramuli sat graciles, ad partes recentissimas tomento molli, patenti, flavescenti (0,7 mm) oblecti, inferne glabrati et cinereo-corticati, subimbricato-foliati. Folia ovata usque oblongo-ovata, apice sensim attenuata vel subacuminata, obtusiuscula, basi leviter cordata, utroque latere glandula basali marginali a petiolo parum remota instructa, subcoriacea, initio utrinque in facie breviter, subtus ad costam longius denseque molliter pilosa, maturitate supra  $\pm$  glabrescentia, subtus praesertim ad costam nervosque diutius pubescentia, integra, margine in sicco  $\pm$  revoluta, 2—3 cm longa, 1,5—2,5 cm lata, costa

supra valde impressa, subtus prominente, nervis lateralibus utroque latere 4—5, inferioribus 2-paribus e basi, superioribus  $\pm$  pinnatim a costa abeuntibus, curvato-ascendentibus et anastomosantibus, supra leviter insculptis, subtus prominulis, reticulatione obscura; petioli tomentosuli, c. 2 mm longi, 1 mm crassi. Racemi pseudoterminales erecti, apicem versus decrescenti-foliati, corolla excepta ubique molliter patenterque tomentosuli; rhachis sat robusta, 4—6 cm longa. Pedicelli subgraciles, sub anthesi 3—5 mm longi, sub fructu usque ad 1 cm accrescentes, basi bractea foliacea forma foliis simili sed multo minore et tenuiore usque ad 1,5 cm longa et 1,2 cm lata suffulti, ultro basi bracteolis 2 subulatis cito caducis instructi. Calycis tubus semiglobosus, c. 2 mm longus et diam., apice contractus, limbus erecto-patens, fere usque ad basin 5-lobus, lobis ovato-delloideis acutis glandula terminali carentibus 2 mm longis. Corolla elongato-urceolata, subcarnosa, utrinque glabra, in vivo saturate rubra vel purpurea, 9—10 mm longa, inferne  $\pm$  2,5 mm diam., lobis reflexis obtusis c. 1 mm longis. Stamina 10, c. 3,5 mm longa; filamenta subulata, omnino glabra, 2 mm longa; thecae oblongae, 1 mm longae; tubuli thecis fere aequilati, 0,5 mm longi, apice oblique scissae poroque magno pollen demittentes. Discus glaber. Stylus glaber, 8 mm longus. Fructus subglobosus, in sicco 5 mm diam., pubescens.

NEW GUINEA. Western part, Wissel Lakes, Lake Tigi, 1750 m, *B.W.* 3276 *Johannes*, fr. Febr. 1957; Arupa, 1750 m, *B.W.* 3014 *Versteegh* (L, type), fl. fr. 22-3-1955; Edarotali, 1800 m, *B.W.* 3303 *Rappard*, fl. Oct. 1955; Enarotali-Kugapa, *Eyma* 4828, fl. March 1939.

99. *V. thibaudifolium* Wernh., Trans. Linn. Soc. ser. 2 Bot. 9, 1916, 93; Sleum., Bot. Jahrb. 72. 1942, 267.

NEW GUINEA. Southwestern part, Utakwa R. to Mt Carstensch, 760 m, *B. Kloss s.n.* (BM, type). Central part, Sibil R. valley, 1260 m, *Kalkman & Tissing* 4123; *Kalkman* 4227; 1 km E of the mouth of the Minam R. into the Bon R., 1500 m, *Kalkman* 4387, 4397.

100. *V. epiphyticum* Merr., Philip. J. Sc. 7, 1912, Bot. 322; En. Philip. 3, 1923, 249; Copel. f., Philip. J. Sc. 42, 1930, 555.

PHILIPPINES. Mindanao, Zamboanga distr., Sax R. Mts, back of San Ramon, *Merrill* 8087 (BM, K, L; PNH, type,  $\dagger$ ).

101. *V. barandanum* Vid., Rev. Pl. Vasc. Filip. 1886, 169; Merr., Philip. J. Sc. 3, 1908, Bot. 376; l. c. 5, 1910, Bot. 372; En. Philip. 3, 1923, 248; Copel. f., Philip. J. Sc. 42, 1930, 556, pl. 2, f. 4—6.

var. *barandanum*.

PHILIPPINES. Luzon, Mountain prov., Benguet subprov., *Loher* 3778, 3779, 3780; Baguio, *Clemens* 51818; *Topping* 99 (US, cit. Copel. f., not seen); *F. B.* 971 *Barnes*; *PNH* 22590 *Steiner*; *Elmer* 8334, 14269; *F. B.* 18334 *Alvarez* (PNH,  $\dagger$ ); *Santos* 9 (A); *B. S.* 5599 *Ramos*; *Sevrens s.n.* (PNH  $\dagger$ ); *F. B.* 20420 (PNH,  $\dagger$ ); *F. B.* 21836 *Leano*; *Merrill* Philip. Pl. 854, 1733; *Baker* 4114 (PNH,  $\dagger$ ); *F. B.* 30192, 30491 *Lasasca*; Mt Santo Tomas, *Elmer* 5806; *F. B.* 25126 *Leano*; *PNH* 2151, 2186 *Quisumbing*; *Clemens* 51819; *Merrill* 11721; Pauai and neighbourhood, *B. S.* 82406 *Quisumbing & Sulit*; *Clemens s.n.* (PNH,  $\dagger$ ); *F. B.* 31704 *Santos*; *Clemens* 7340 (UC, cit. Copel. f., not seen); Tadian?, *F. B.* 18345 *Alvarez* (PNH,  $\dagger$ ); Bucao, *F. B.* 14423 *Darling*; Trinidad to Tabio, *F. B.* 15943 *Bacani* (PNH,  $\dagger$ ); Mt Pulog, *F. B.* 16073 (PNH,  $\dagger$ ), 18053 (PNH,  $\dagger$ ), 18096 *Curran*, *Merritt & Zschokke*. Lepanto subprov., *Vidal* 1532 (FI; K, type; L), 1535 p.p. (FI, L); Mt Data, *Merrill* 4580; Cervantes, *F. B.* 5672 *Klemme*; Mt Malaya, *F. B.* 14500 *Darling*; Bauco, *Vanoverbergh* 1053. Bontoc subprov., Mt Sisipatan, 1830 m, *Santos* 5539. Abra



prov., Tue, *F. B. 14596 Darling* (PNH, †). Nueva Vizcaya prov., Carballo Mts, *Loher s.n.* (UC, cit. Copel. f., not seen). Rizal prov., *Loher 12248*; Montalban, *Loher 12668, 13171*; Balacbac, *Loher 13073 & 13076* (UC, cit. Copel. f., not seen); Paningtingan, *Loher 13458* (PNH, †). Zambales prov., Mt Pinatubo, *Elmer 21997*.

var. **cagayanense** Copel. f., Philip. J. Sc. 42 (4), 1930, 557.

PHILIPPINES. Luzon, Mountain prov., Benguet subprov., Mt Pulogloco, *B. S. 40389 Ramos & Edano*. Ifugao subprov., Monhoyohoy, *F. B. 29407 Zschokke & Laraya* (A; UC, US, cit. Copel. f., not seen). Nueva Vizcaya prov., Mt Alzapan, *B. S. 45596 Ramos & Edano*. Isabela prov., Mt Moises, *B. S. 47300* (A, BM, BO, NY, P, SING; UC, type, not seen); *Clemens 16962, 16963*. Cagayan prov., Mt Cagua, *B. S. 78426 Edano*; Mt Dos Cuernos, 1740 m, *B. S. 77022 Ramos*. Laguna prov., Luisiana, 500 m, *F. B. 24660 Amarillas* (A).

var. **hutchinsonii** (Merr.) Copel. f., Philip. J. Sc. 42 (4), 1930, 558. — *V. hutchinsonii* Merr., Philip. J. Sc. 2, 1907, Bot. 294; En. Philip. 3, 1923, 249.

PHILIPPINES. Mindoro, Mt Halcon, 2000 m, *Merrill 5524* (NY; PNH, type of *V. hutchinsonii*, †); *ibid.*, 1600 m, *PNH 20498 Rabor* (petiole stout and rather short).

NOTE: A plant corresponding by its leaves to var. *hutchinsonii*, but with densely shortly grey-pubescent rhachis, pedicel, calyx, and disk, no flowers known, appears to be a not yet described variety, outside the area of *V. barandatum* in Luzon:

PHILIPPINES. Luzon, Camarines Sur prov., Kamugong R., 485 m, *B. S. 75850 Edano* (BO, NY).

102. **V. scortechinii** K. & G., J. As. Soc. Beng. 74, ii, 1905, 62; Ridl., J. Fed. Mal. St. Mus. 4, 1909, 41; l. c. 6, 1915, 156; Fl. Mal. Pen. 2, 1923, 207; Henders., Mal. Nat. J. 6 (1), 1950, 259, f. 243.

MALAY PENINSULA. Perak, G. Kerbau, 1675—2273 m, *For. Dep. F. M. S. 31443, 31469, 32110, 32139 Symington*; *Haniff 3966*; *Morgan s.n.* (P). G. Batu Puteh, 915—2040 m, *Wray 336* (BM), 356; *Kunstler 8028*. Cameron Highlands, G. Berumbun, Telom, 1980 m, *Ridley 13692*; G. Batu Brinchang, 2040 m, *For. Dep. F. M. S. 25942, 36519 Jaámat*; *Henderson SF 23579*; B. Gagau, 1900 m, *For. Dep. F. M. S. 23890 Osman*; G. Irau, 1830 m, *For. Dep. F. M. S. 36551 Symington*; Perak, locality not given, *Scortechinii s.n.* (CAL, lectotype, not seen; K); *Wray 888* (CAL, cit. K. & G., not seen; G). Pahang, G. Tahan, 2170 m, *Ridley 16052*.

103. **V. agusanense** Elm., Leaflet. Philip. Bot. 7, 1915, 2630; Merr., En. Philip. 3, 1923, 247; Copel. f., Philip. J. Sc. 42, 1930, 551, pl. 1, f. 3—5.

PHILIPPINES. Mindanao, Agusan prov., Cabadbaran, Mt Urdaneta, 1745 m, *Elmer 13765* (BM, BO, FI, GH, K, L, NY; PNH, type, †; US, cit. Copel. f., not seen). Lanao prov., 1125 m, *F. B. 25223 Alvarez*. Bukidnon prov., Kabaritan, *F. B. Rola s.n.* (A); Mt Katanglad, 1800 m, *PNH 9905 Sulit*, fr.

104. **V. philippinense** Warb. in Perk., Fragm. Fl. Philip. 1905, 174; Merr., Philip. J. Sc. 3, 1908, Bot. 377; En. Philip. 3, 1923, 251; Copel. f., Philip. J. Sc. 42, 1930, 550, pl. 1, f. 1—2.

PHILIPPINES. Luzon, Quezon prov., Mts of S. Cristoval and Mayayay, *Cuming 822* (L, P); Tayabas, *Cuming 832* (A; B, type, †; BM, K, L, NY). Laguna prov., Mt Maquilang, *Reyes s.n.* (PNH, †); *Holman 5*; *Merrill 8035*; *Baker 374* (PNH, †); *F. B. 24897 Mabesa*; *Elmer 17938, 18308*; San Antonio (Paete), *B. S. 15057 Ramos*. Rizal prov., Mt Batay, *Loher 6186* (K); Mt Susong-dalaga, *B. S. 29359 Ramos & Edano*; Montalban, *Loher 12482* (cit. Copel. f., not seen), 13252, 13265; San Isidro, *Philip. Pl. 303 Ramos*; Angilog, *Loher 6182, 6185, 6191, 6195*; Mt Irig, *B. S. 42288 Ramos*; Mt Lumutan, *B. S. 29769 Ramos & Edano*. Nueva Ecija prov., Mt Umingan, *B. S. 26408 Ramos & Edano*. Lepanto prov., *Vidal 3147* (K).

105. *V. dubiosum* J. J. S., Bot. Jahrb. 68, 1937, 214.

CELEBES. Central part, Tadjambu, near Makale, 800 m, *Kjellberg* 3969 (BO, type, fl. anom.). Porehu, subdiv. Malili, 1200 m, *F. R. I. bb.* 19557 (BO, defl. & fr.). No locality given, *Kjellberg* 3176 (BO, fl. prob. galled).

106. *V. grandibracteatum* Schltr, Bot. Jahrb. 55, 1918, 180; Sleum., l. c. 72, 1942, 267.

NEW GUINEA. Northern part, Sepik Distr., Sepik R., bivouac 42—43 (c. 141°5'—4°5'), c. 40 m, *Schutze Jena* 229 (B, type, †), 312 (B, †).

107. *V. dominans* Sleum., Bot. Jahrb. 72, 1942, 268.

NEW GUINEA. Northern part, Oranje Mts, Wilhelmina top area, 3400—3800 m, *Brass* 9422 (A, BM, BO, K; L, type; LAE); *Brass & Meijer Drees* 9636, 9663, 9938, 10301; Lake Habbema, 3225 m, *Brass* 9066, 9290, 9484, 10440 (A), 21105 (A).

108. *V. montis-ericae* Sleum., Bot. Jahrb. 72, 1942, 267.

NEW GUINEA. Southwestern part, Hellwig Mts, Ericatop, 1520 m, *Pulle* 816 (B, type, †; BO, K, L).

109. *V. papuanum* J. J. S., Bull. Jard. Bot. Btzg II, 8, 1912, 51; Nova Guinea 12 (2), 1914, 162, t. 48; l. c. 18, 1936, 118; Sleum., Bot. Jahrb. 72, 1942, 253. — *V. adenanthum* Sleum., l. c. 268.

NEW GUINEA. Northern part, Mt Cyclops, c. 1800 m, *Gjellerup* 538 (BO, lectotype of *V. papuanum*; L); *Mayr* 538 (BO). Oranje Mts, Bele R., 2000 m, *Brass* 11602 (A, BM, BO, K; L, type of *V. adenanthum*). Balim R. valley, 1600—2200 m, *Brass* 11600, 11749.

Note: The specimen von Römer 990 (BO, fragment) from the Hellwig Mts, cited in the original description of *V. papuanum* as syntype, has short and broad obliquely cut (not bifid) tubules and does not belong to *V. papuanum*. The material is too poor for classification.

110. *V. platyphyllum* Merr., Philip. J. Sc. 12, 1917, Bot. 294; En. Philip. 3, 1923, 251; Copel. f., Philip. J. Sc. 42, 1930, 573, pl. 5, f. 1—2. — *V. ilocanum* Merr., l. c. 14, 1919, 441; En. Philip. 3, 1923, 294. — *V. rizalense* Merr., Philip. J. Sc. 27, 1925, 43.

PHILIPPINES. Luzon, Tayabas prov., Dingalan vicinity, c. 200 m, *B. S.* 26583 *Ramos & Edano* (PNH, type of *V. platyphyllum*, †; US, cit. Copel. f., not seen). Ilocos Norte prov., Mt Palimlim, 1065 m, *B. S.* 33372 *Ramos* (A, BO, K, L, P; PNH, type of *V. ilocanum*, †; US, cit. Copel. f., not seen). Rizal prov., Guinuisan, *Loher* 12150; Balabac, *Loher* 14979 (PNH, type of *V. rizalense*, †; UC, cit. Copel. f., not seen).

111. *V. miquelii* Boerl. in Veth, Midden-Sumatra 4 (2), 1884, 22; Ridl., J. Fed. Mal. St. Mus. 8, 1917, 56; Jacobs, Reinwardtia 3 (1), 1958, 68. — *V. myrtoides* var.  $\beta$  Miq., Ann. Mus. Lugd.-Bat. 1, 1863, 38. — *V. forbesii* Fawc. in Forbes, Wand. 1885, 278, fig., nec Hook. 1841. — *V. dempoense* Fawc., J. Bot. 23, 1885, 254; Sp. Moore, l. c. 63, 1925, Suppl. 57.

#### var. *miquelii*.

SUMATRA. West coast, Mt Kerintji, 2000—2400 m, *Sum. Exp. A. L. van Hasselt* anno 1877 (L, type of *V. miquelii*); *Holtum SF* 26229; *Robinson & Kloss* 103, 121; 121; *Jacobson* 2462; *Bünnemeijer* 10019, 10020; *Frey-Wysseling* 134; *Meijer* 7605a; *Jacobs* 4401. G. Merapi, 2500—2600 m, *Meijer* 3056; *Bünnemeijer* 5008; *Schiffner* 2356, 2375; *Van Borssum Waalkes* 2225. Mt Singgalang, 1700—2800 m, *Beccari P. S.* 230, 270, 340;

*Bünnemeijer* 2853a; *Meijer* 3847, 3880. Palembang, G. Dempo, 2500—3100 m, *Forbes* 2371 & 2371 x (BM, type of *V. forbesii* resp. of *V. dempoense*; GH, L; NY, fragm. ex BM); *Jacobson* 523; *De Voogd* 387, 1568. Benkulen, G. Kaba, 1700 m, *De Voogd* 519; *Bally* 7. Locality not given, *Korthals* (L, type of *V. myrtoides* var.  $\beta$ ).

var. *atjehense* Sleum., nov. var. — Frutex parvus, interdum enanus et semirepens. Folia minora, 0,7—1,2 cm longa, 0,4—0,6(—0,8) cm lata. Corolla anguste urceolata, 4(—5) mm longa, c. 2,5 mm lata, extus subdense pilosa, intus ad basin subdense, apicem versus laxius pilosa. Stamina 10, 2,5—3 mm longa, alternatim subinaequilonga; filamenta 2—2,4 mm longa, dense pubescentia; thecae 0,8—0,9 mm longae; tubuli 0,2—0,3 mm longi, apice oblique scissi.

SUMATRA. Atjeh, Gajo Lands, top of G. Lembuh, c. 3000 m, *Van Steenis* 9091 (A, BO, K; L, type; SING), in scrub forest, fl. 21/22-2-1937. Putjuk Angasan, 2500 m, *Van Steenis* 8353, 8416. G. Losir massif, 2250—3500 m, *Van Steenis* 8471, 8477, 8529, 8644. G. Kemiri, top plateau, 3150—3314 m, *Van Steenis* 9663.

112. *V. korinchense* Ridl., J. Fed. Mal. St. Mus. 8, 1917, 56. — *V. eugenioides* Sp. Moore, J. Bot. 63, 1925, Suppl. 56. — *V. parvibaccatum* J. J. S. in Merr., Contr. Arn. Arb. 8, 1934, 128. — *V. dempoense* (non Sp. Moore) *De Voogd*, Trop. Natuur 23, 1934, 82, 83, in text.

var. *korinchense*.

SUMATRA. Atjeh, Putjuk Angasan, 2400 m, *Van Steenis* 8296. Eastcoast, G. Sibayak, 1300—1900 m, *Yates* 1973; *Lörzing* 5988, 8300; *Bangham* 1022. G. Sinabung, 1800—2600 m, *Lörzing* 8154, 8180; *Bangham* 1179. Dolok Baros, Karo highplateau, 1950 m, *Lörzing* 16231. Pangulubao, 1800—2100 m, *Lörzing* 17116. G. Pinto, 1900—2200 m, *Lörzing* 8253; *C. Hamel & R. Si Toroes* 594 (A). Deiri Lands, *Dames* 71. Berastagi, *For. Dep. F. M. S.* 24682, 24668, 25055 *Symington*. Locality not given, *Yates* 50 (A). Tapanuli, Dolok Surungan, Habinsaran, *Bartlett* 8024. Highplateau Siburong, *Van der Koppel* 5. Lintung Ni Huta, near Dolok Sangul, 1300 m, *Huitema* 74; Lintung Ni Huta-Paranginan, *Ouwehand* 308. Taun-na-uli, Toba, *R. Si Boeea* 10142. Si Gelapang, 1400 m, *Polak* 101. NW. Toba Lake, Peso-Peso, 1200—1500 m, *Bangham* 1069 (A, type of *V. parvibaccatum*; K). Dolok Sopo Raso, Toba, *R. Si Boeea* 11271. Hutagindjang, Toba Lake, *Posthumus s.n.* Westcoast, G. Kerintji, Sg. Kumbang, 1370 m, *Robinson & Kloss* 42 (BM, type of *V. korinchense*); *ibid.*, (1100—)1400—2200 m, *Jacobs* 4322, 4381, 4549; *Alston* 14131a, 14153; *Bünnemeijer* 8562, 8626, 8821; *Meijer* 7422. Bt. Puntjak, 1200 m, *Jacobson* 57. Mt Singgalan, 2000 m, *Beccari P. S.* 343, 362. G. Talamau, 1900 m, *Bünnemeijer* 913. Benkulen, Bt. Darun, 2200 m, *De Voogd* 1399. G. Kaba, 1200 m, *De Voogd* 1343. Suban Ajam, *Jacobson* 378. Lebong, Pasir Lebar, mud-flow Beriti, 1000 m, *De Voogd* 1131 (*V. 'dempoense'*). Lampung, G. Tenggamus, 1525—2135 m, *Forbes* 1872, 1882a; *Toxopeus* 20; *Lieftinck* 40. G. Pesagi, 2200 m, *De Voogd* 1534; *Forbes* 2052 (BM, lectotype of *V. eugenioides*; GH; NY, fragm. ex BM).

var. *losirensense* Sleum., nov. var. — Folia densa, (0,8—)1—1,5 cm longa, (0,4—)0,5—0,6(—0,7) cm lata. Calyx glaber vel subglaber. Corolla subovoideo-cylindrica vel ampullacea, rubra, 6 mm longa, inferne 2—2,5 mm diam., in superiore tertio  $\pm$  abrupte angustata. Stamina alternatim 2,5 et 3 mm longa; filamenta 2—2,5 mm longa; thecae c. 0,5 mm longae; tubuli 0,3 mm longae, apice oblique scissae. Stylus glaber, 5 mm longus.

SUMATRA. Atjeh, G. Losir, Central and Eastern top, 2950—3500 m, *Van Steenis* 8635, 8656 (BO; L, type), fl. 3/6-2-1937.

113. *V. myrtoides* (Bl.) Miq., Fl. Ind. Bat. 2, 1859, 1062; Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 38; Koord.-Schum., Syst. Verz. 3, 1914, 100; J. J. S., Med. Rijksherb. 30, 1916, 7, incl. var. *celebicum* J. J. S., l. c. 8; Merr., Philip.



J. Sc. 12, 1917, Bot. 293; Brown, Minor Prod. Philip. For. 2, 1921, 362, f. 77; Merr., En. Philip. 3, 1923, 250; Heyne, Nutt. Pl. Ned. Ind. ed. 2, 1927, 1218 (var. *celebicum*); Copel. f., Philip. J. Sc. 42 (4), 1930, 596, pl. 7, f. 1—2. — *Thibaudia myrtooides* Bl., Bijdr. 1826, 861. — *Agapetes myrtooides* (Bl.) G. Don, Gen. Syst. 3, 1834, 863 (*myrtoidea*); Dun. in DC., Prodr. 7, 1839, 555. — *V. microphyllum* (non Reinw. ex Bl.) F. Vill., Nov. App. 1880, 121, p.p.; Koord., Minah. 1898, 514. — *V. varingiaefolium* (non (Bl.) Miq.) Vid., Sinopsis, Atlas, 1883, 30, t. 60, f. D. — *V. sp.*, Vid., Phan. Cum. Philip. 1885, 27, 123. — *V. villarii* Vid., Rev. Pl. Vasc. Filip. 1886, 166; Rolfe, J. Bot. 24, 1886, 348; Merr., Philip. J. Sc. 2, 1907, Bot. 294; l. c. 3, 1908, Bot. 374; l. c. 5, 1910, Bot. 372; Elm., Leaf. Philip. Bot. 3, 1911, 1092.

PHILIPPINES. Mindanao, Davao prov., Mt Apo, 2750—3200 m, *Copeland 1052, 1418; Mearns s.n.* (US, cit. Copel. f., not seen); *Hachisuka s.n.; Williams 2576; Elmer 11392* (PNH, †), 11767; *Clemens 15682* (UC, cit. Copel. f., not seen); *PNH 1458, 1464 Edano.* Mindoro, Mt Halcon, *Merrill 5502.* Luzon, Albay prov., *Cuming 935; Mt Mayon, 1000—2100 m, Vidal 817; B. S. 2949 Mearns; B. S. 6493 Robinson; B. S. 19027 Rosenbluth* (PNH, †); *PNH 18333 Mendoza.* Laguna prov., Mt Banahao, 2000 m, *Vidal 414* (FI; K, lectotype of *V. villarii*; L, MA); *Loher 6204; B. S. 2390 Foxworthy; F. B. 7891 Curran & Merritt* (PNH, †); *B. S. 6063 Robinson* (US, cit. Copel. f., not seen); *B. S. 6561 Robinson* (PNH, †); *B. S. 30077 Sulit* (UC, cit. Copel. f., not seen). Mt San Cristobal, *Gates 6372* (PNH, †). Mountain prov., *PNH 18904 H. St. John.* Benguet subprov., *Loher 3772, 3773; Merrill 1166* (US, cit. Copel. f., not seen); *B. S. 2830 Mearns; B. S. 5376 Ramos; Baguio, 1000 m, Van Steenis 17920; Topping 56* (US, cit. Copel. f., not seen); *Elmer 5955; F. B. 951 Barnes; Williams 1156, 1458; Santos 35; McClure 15900* (UC, cit. Copel. f., not seen); *F. B. 30191 Lagasca; F. B. 30492 Lagasca* (UC, cit. Copel. f., not seen); *Cervantes trail, F. B. 25158 Garcia* (PNH, †); *Loö, F. B. 10937 Curran; B. S. 5934 Ramos; Mt Pauai, 2380 m, B. S. 4274 Mearns; B. S. 8419 McGregor; B. S. 31841 Santos; B. S. 8239 Quisumbing & Sulit; Mt Pulog, F. B. 16177 Curran, Merritt & Zschokke; B. S. 44881 Ramos & Edaño; Mt Data, 1525—2135 m, Micholitz s.n. (K); Whitehead anno 1896 (BM); Loher 3774.* Bontoc subprov., *PNH 35823 Steiner; Vanoverbergh 2060; Sagada, 1495 m, Santos 5763.* Lepanto subprov., *Vidal 1533; Bauco, Vanoverbergh 287, 3869* (PNH, †). Ifugao subprov., Mt Polis, *B. S. 37634 Ramos & Edaño.* 'Montes Igorrotes', *Calléry 38* (G), 39 (P). Luzon, locality not given, *Lobb s.n.*

CELEBES. Minahasa, G. Sempo, *Reinwardt s.n.* (L, lectotype of *V. myrtooides* var. *celebicum*). G. Klabat, 1800—2000 m, *Steup 164; Sarasin 247; Koorders 19438.* G. Sopotan, 1300—1827 m, *Sarasin 1102; Koorders 19439, 19445; Rant 914.* G. Masarang, *Sarasin 613.* Kelelonde, *Alston 15801.* No locality given, *Forsten s.n.* (L).

MOLUCCAS. Tidore, on the top, *Reinwardt anno 1821* (L, type of *Thibaudia myrtooides*; P, S).

114. *V. glandellatum* Sleum., nov. spec. — Frutex usque ad 1,5 m altus. Ramuli graciles, ad partes novellas glabri et striati, inferne cito nigrescenti-corticati, sat laxe foliati. Folia subovato- vel lanceolato-, interdum oblongo-elliptica, apice breviter ( $\pm 1$  cm) subcaudato-acuminata, paullo curvata, obtusiuscula, basi late in petiolum attenuata, ad ipsam basin 2—4 mm longe protracta manifesteque utroque latere (in apice petioli) biglandulifera, subcoriacea, glabra, subtus in sicco multo pallidiora et laxe appresse glanduloso-miculata vel -punctulata, integra, (4—)4,5—5,5(—7) cm longa, (1,8—)2—3 cm lata, e basi et paullo supra basin 7—9-plinervia, costa supra imprimis inferne parum impressa, subtus obtuse prominula, nervis basalibus et supra-basalibus praerupte ascendentibus et praeter marginem excurrentibus vel obscure anastomosantibus, nervis aliis (vel venis) superioribus paucis pinnatis multo brevioribus, omnibus supra vix, subtus parum elevatis, reticulatione sat densa,

supra obscura, subtus prominula; petioli 4—6 mm longi, c. 1 mm crassi, parum applanati, supra distincte sulcati. Racemi ex axillis superioribus orti, erecto-patentes, usque ad basin multiflori; rhachis sat gracilis, varie angulata et striata, (4—)5—9 cm longa, basi c. 1 mm crassa, laxe vel laxissime glanduloso-muriculata. Pedicelli graciles, 5—8 mm longi, basi bractea subfoliacea membranacea anguste elliptica utrinque acute attenuata inferne glandulis 2 marginalibus manifestis obsita, 4—7(—10) mm longa, 1,5—2,5(—3) mm lata, sub anthesi persistenti fulti, sicut calycis tubus subdense glanduloso-muriculati. Calycis tubus late cupulatus, basi rotundatus, 1—1,2 mm altus, limbus  $\pm$  patens, usque ad basin 5-lobus, lobis ovato-deltaeideis obtusis, glandula apicali carentibus, dorso laxissime glanduloso-muriculatis, ciliolatis, 1—1,5 mm longis. Corolla ampullacea, c. 1 cm longa, inferne inflata et 4—5, superne subabrupte angustata et c. 2 mm diam., membranacea, in tubo rosea, extus minute puberula laxequae vel densius subappresse glanduloso-muriculata, intus glabra, lobis obtusis albido-cremeis, reflexis, c. 1,5 mm longis. Stamina 10,3—3,5 mm longa, alternatim paullo longiora et breviora; filamenta linearia, basin versus dilatata, dense breviter pilosa, c. 2 mm longa; thecae late oblongae, ecalcaratae, cum tubulis 1,3—1,5 mm longae; tubuli thecis aequilati, brevissimi, apice oblique scissi, poro magno ovali pollen demittentes. Discus glaber. Stylus crassus, glaber, 6—7 mm longus. Fructus maturus non visus.

NEW GUINEA. Central part, Sibil R. valley, 1260 m, *Kalkman 4010, 4034* (L, type), on poor, white, impervious clayey soil, common, fl. 13-5-1959.

115. **V. paludicolum** Sleum., nov. spec. — Frutex terrestris. Ramuli graciles, teretes, in partibus et novellis et vetustioribus dense subpatenter hirsutuli, dense foliati. Folia ovata, apice breviter attenuata vel subacuminata, apice ipso obtusa, basi rotundata, glandulis 2 marginalibus basalibus distinctis a petiolo valde remotis instructa, coriacea, in sicco supra cinerascens-olivacea, subtus brunnea, glabra, subtus nigrescenti-punctulata, integra, margine haud vel brevissime recurvata, 6—10(—12) mm longa, (4—)5—8 mm lata, costa supra parum impressa, subtus minute obtusissimeque elevata, nervis venisque subinconspicuis; petioli crassiusculi,  $\pm$  1 mm longi, hirsutuli. Racemi ex axillis pluribus superioribus orti, 5—10-flori, secundi; rhachis subcrassa, sicut pedicelli  $\pm$  dense flavido-hirsutula, (1—)1,5—2(—3) cm longa. Pedicelli 3 mm longi, basi bractea foliacea tenui foliis multo minore post anthesin caduca suffulti. Calyx laxe usque laxissime pilis hirtis indutus, tubo campanulato, inferne parum constricto, 1,5 mm longo, apice fere 2 mm diam., limbo patenti vel reflexo, lobis deltaeideis subacutis 0,5—0,8 mm longis, glandula apicali carentibus. Corolla subampullaceo-cylindrica, in superiore tertio subabrupte attenuata, saturate rubra, extus glabra, intus laxe pilosa, 7—8 mm longa, inferne 2, superne 1—1,3 mm diam., lobis suberectis vel  $\pm$  reflexis c. 0,5 mm longis. Stamina 10, alternatim 3,5 et 2,8 mm longa; filamenta subulata, dense pilosa, alternatim 2 et 2,7 mm longa; thecae subquadratae, ecalcaratae, cum tubulis c. 1 mm longae, tubulis ipsis brevissimis transverse scissis poroque terminali magno pollen demittentibus. Discus glaber. Stylus gracilis, glaber, fere 7 mm longus. Bacca haud visa.

CELEBES. Central Eastern part, subdiv. Kolonedale, between saddle and E slope of the Tomongkobae group, *Eyma 3957* (A, BO; L, type), fl. 9-10-1938. Subdiv. Poso, Lake Poso, c. 2000 m, *Steup 7* (BO). Poso, Boro-Poena. 1700—1800 m, on peaty quartzite plateau, *Eyma 1615* (BO, L), fl. 10-8-1937.

116. *V. lucidum* (Bl.) Miq., Fl. Ind. Bat. 2, 1859, 1061; O. Ktze, Rev. Gen. Pl. 2, 1891, 385, incl. f. *terrestre* O. Ktze & f. *epiphyticum* O. Ktze, l. c.; Koord.—Schum., Syst. Verz. 1912, fam. 233, p. 110; Koord., Exk. Fl. Java 3, 1912, 12; J. J. S. in K. & V., Bijdr. 13, 1914, 148; Koord., Fl. Tjibodas, 1918, fam. 233, p. 9; Sp. Moore, J. Bot. 63, 1925, Suppl. 55; Hochr., Candollea 2, 1925, 499, incl. var. *typicum* Hochr., l. c. & var. *micranthum* Hochr., l. c. 500; J. J. S. in Fedde, Rep. 30, 1932, 177; Malm, l. c. 34, 1934, 284; Doct. v. Leeuwen, Pangrango, 1933, 209; J. J. S., Bot. Jahrb. 68, 1937, 211; Amsh. in Back., Bekn. Fl. Java (em. ed.) 7, 1948, fam. 163, p. 3. — *Thibaudia lucida* Bl., Bijdr. 1826, 860; Hassk., Cat. Hort. Bot. Bog. 1844, 161. — *Agapetes lucida* (Bl.) G. Don, Gen. Syst. 3, 1834, 863; Dun. in DC., Prodr. 7, 1839, 555; Moritz, Syst. Verz. Zoll. 1846, 42; Hassk., Pl. Jav. Rar. 1848, 471; Zoll., Syst. Verz. 2, 1854, 137. — *Agapetes microphylla* Jungh., Nat. Geneesk. Arch. N.I. 2, 1845, 35; Hassk., Flora 30, 1847, 524; Walp., Ann. 1, 1848/49, 475. — *Epigynium lucidum* (Bl.) Klotzsch, Linnaea 24, 1851, 52. — *V. rollisoni* Hook., Bot. Mag. 1851, t. 4612; Walp., Ann. 5, 1858, 440; Miq., Fl. Ind. Bat. 2, 1859, 1062; Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 37; Hall. f., Med. Rijksherb. 12, 1912, 29. — *Agapetes elliptica* (non (Bl.) Don) Moritz, Syst. Verz. Zoll. 1846, 42, nom. nud.; Zoll., Syst. Verz. 2, 1854, 137, nom. nud.

var. *lucidum*.

SUMATRA. Atjeh, G. Losir, 2250—2800 m, *Van Steenis* 8472, 8530. G. Lembuh region, 1000—3000 m, *Van Steenis* 9074, 9250. Westcoast, G. Kerintji, 1500—2000 m, *Meijer* 6155; *Bünnemeijer* 9082, 9257, 9481; *Alston* 14106. G. Talamau, 2400—2800 m, *Jacobson* s.n.; *Bünnemeijer* 836. G. Sago, 1700—1900 m, *Jacobs* 4682; *Maradjo* 217. Taram, E. of Jakakumbuh, 500—1000 m, *Meijer* 7052. Benkulen, G. Dempo, 1290—2000 m, *Forbes* 2433, 2567a; *Ajoeb* 488. Mt Belirang, 1500 m, *Rappard* 64. Suban Ajam, *Ajoeb* 298. G. Pesagi, 1800 m, *Van Steenis* 3627.

JAVA. Bantam, G. Karang, 1100—1770 m, *Kuhl & Van Hasselt* s.n.; *Koorders* 9679; *Winckel* 16. Pasir Orai, 885 m, *Forbes* 338. Nirmala, *Backer* 10642, 10782. Preanger/Djakarta, G. Salak, (600—)1000—2215 m (top), *Blume* s.n. (BO, K; L, type of *Thibaudia lucida*); *Lobb* s.n. (K, type of *V. rollinsonii*); *Zollinger* 882, 952 p.p. (A, BM, sub *Agapetes elliptica*); *Koorders* 24276, 36690; *Hoogerwerf* 2; *Van Steenis* 3036; *Raap* 217. G. Gedeh, 1425—2200 m, *Valeton* s.n.; *Backer* 14878, 15032, 22310; *Hallier* 434, 452; *Meijer* 2863; *Hochreutiner* 1048, 1748 (G, type of *V. lucidum* var. *micranthum*). G. Batu (Tjianten), 1000 m, *Backer* 25833. G. Malabar, 1980—2100 m, *Forbes* 959 c; *V. d. Pijl* 242 a, 654; *Den Berger* 768. Takola region, 1200 m, *Koorders* 32866. Tjigenteng region, 1700 m, *Koorders* 26432. Pangentjongan-Telagabodas, 1700 m, *Koorders* 26750; *Kawatjiwidai*, *Teysmann & Scheffer* s.n.; G. Gombong, Tjibeber, *Winckel* 635; Tjibodas and vicinity, 1400—2400 m, *Koorders* 25954, 25996, 31560, 31581, 31588, 32219, 36631; *Van Steenis* 1904; *Boerlage* s.n.; *Van Harreveld* 6216; *Schiffner* 2361; *Raap* 739; *Scheffer* s.n.; *Massart* 176; *Kjellberg* s.n.; O. Kuntze 4567 (NY, type of *V. lucidum* f. *epiphyticum*), 4538 (NY, type of *V. lucidum* f. *terrestre*); *Beccari* s.n.; *Yates* 2971; *Bruggeman* 297; *Main* 86; *Djamhari* 78. G. Wayang, 1850 m, *Hochreutiner* 1573; *Forbes* 638. Pengalengan, 1650 m, *Backer* 26195. G. Halimun, *Hasskarl* s.n. G. Prahu, 2300—2550 m, *Backer* 21824; *Lörzing* 323; *Horsfield* 344. Papandayan, 2500—2600 m, *Korthals* s.n.; *Van Steenis* 4143, 4144. G. Kendang, 1950 m, *Rant & Smith* 295 a. Pangrango, 1200—2300 m, *Bakhuizen v. d. Brink* 2336; *Docters van Leeuwen* 4018. G. Patuha, 1600—2200 m, *Reinwardt* s.n.; *Hildebrand* 168; *Lörzing* 1372; *Meijer* 417. G. Megamendong, *Reinwardt* s.n. Tjidadap, 1300 m, *Bakhuizen v. d. Brink* 16, 2637. Tjikakapa, *Van Slooten* 750. G. Beser, *Winckel* 932; *Backer* 22605. G. Sindanglaya, *Holstvoogd* 247; *Ploem* s.n. G. Masigit, *Lörzing* 1227. Tjikerang, 700—800 m, *Van Steenis* 238. Kali Puteh, 1900—2000 m, *Van Steenis* 4601. G. Perbakti, 1700 m, *Bakhuizen v. d. Brink* 1697. Gegerbintang, 1650 m, *Burck* 619; *Hochreutiner* 1156. Indragiri, Bandung, *Bakhuizen v. d. Brink* 279. Locality not given, *Blume* s.n.; *Junghuhn* s.n.; *De Vriese* s.n.; *Waitz* s.n.; *Warburg* 11066; *Kollmann* s.n.; *Goering* 89 (P). Peka longan, G. Ragad-



jembangan, 2150 m, *Backer 16137*. Banjumas, G. Slamet, 2100 m, *Backer 300, 467*. Kedu, G. Sindoro, 1700—2200 m, *Koorders 11375*. Djieng, *Junghuhn s.n.* (L, type of *Agapetes microphylla*). G. Kembang, 2200 m, *Koorders 10934*. G. Prau, 2300 m, *Lörzing 323*. Semarang, G. Telemojo, 1400—3035 m, *Koorders 9682, 9683, 28035, 29680, 31194, 36197* (cit. '36199'); *Coert 1606*. G. Ungaran, *Junghuhn s.n.* Madiun, G. Lawu, 1500—1700 m, *Elbert 324, 335; Dorgelo 326*. Malang, G. Tengger, *Kobus s.n.* G. Bromo, 1250 m, *O. Kuntze 6005*. G. Smeru, Ranu pani, 2120 m, *Coert & Ten Houten 1575*. Besuki, G. Tarub, 1500—1600 m, *Van Steenis 10705*. G. Hijang, 1900—3000 m, *Arens 80; Jeswiet 375; Backer 9655, 9780, 9788; Koorders 43558; Van Dillewijn 174; Van Steenis 10898*. G. Lamongan, *Wurth s.n.* Idjen, *Kleinhoonte 223*.

BALI. G. Agung, 1800—3150 m, *De Voogd 1942; Van Steenis 7876*. G. Batukau, 1200—1875 m, *Sarip (Exp. Maier) 382; De Voogd 1973*.

LOMBOK. G. Rindjani, 1750—2250 m, *Tengwall 38; Gründler 2269, 2343; Elbert 1025, 1184, 1330*.

FLORES. Western part, G. Mandaswae, *Posthumus 3360*. Ruteng Mts, Rana mesi, 1200—1300 m, *Rensch 1306; De Voogd 1785*.

CELEBES. Central part, subdiv. Poso, G. Lumut, on 'pilar top en W. bijtop', *Eyma 3634* (leaves small). Subdiv. Enrekang, G. Sinadji, *Rachmat 907*. Masamba, between Kambuno and Tomadu, 2550—2800 m, *Eyma 1402*. Enrekang-Pokapindjang-Pinteaalon, 2400—2600 m, *Eyma 527, 528 p.p., 531; ibid.*, Tinábang-Rantemario, 3000—3300 m, *Eyma 676; Pokapindjang-Tinábang, 2800—3000 m, Eyma 653; Pokapindjang, 2300—2800 m, Kjellberg 1489, 1517, 3917; Pokapindjang, 2000—2500 m, Kjellberg 1488 (S), 1507 (S)*. South western part, Peak of Bonthain, 2135—2850 m, *Everett 45, 46; Wawokaraeng, Warburg 16831; Bantaeng, 2500—2890 m, Bunnemeijer 11923, 12225, 12248*.

var. *roseitinctum* Sleum., nov. var. — Corolla saturate rosea, extus omnino subdense pubescens. Filamenta filiformia, supra basin tantum pilosa, (2,5) 3—3,5 mm longa; tubuli brevissimi.

SUMATRA. Atjeh, G. Kemiri, 2850—3300 m, *Van Steenis 9682* (BO; L, type), in summit scrub, fl. 10-3-1937. G. Losir, 2700—2800 m, *Van Steenis 8508*. G. Lembuh to bivouac Halfweg, 1850—3000 m, *Van Steenis 9146*.

117. *V. varingiaefolium* (Bl.) Miq., Fl. Ind. Bat. 2, 1859, 1061; Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 38 (excl. specim. borneense), f. *parvifolium* & f. *sublanceolatum* Miq., l. c.; Bl. & Fisch., Fl. Javae, Pl. inéd. 1863/83, t. 19; O. Ktze, Rev. Gen. Pl. 2, 1891, 385, incl. var. *angustifolium* O. Ktze & var. *erythrinum* (Hook.) O. Ktze, l. c.; Koord., *Junghuhn Gedenkb.* 1910, 185; Exk. Fl. Java 3, 1912, 14, f. 3; Hall. f., *Med. Rijksherb.* 12, 1912, 29; Koord.-Schum., *Syst. Verz.* 1912, fam. 233, p. 112; J. J. S. in K. & V., *Bijdr.* 13, 1914, 152 (*varingifolium*); Koord., Fl. Tjibodas, 1918, fam. 233, p. 8; Seifrizz, *Bull. Torr. Bot. Cl.* 50, 1923, 300; Sp. Moore, *J. Bot.* 63, 1925, Suppl. 56; Hochr., *Candollea* 2, 1925, 497, incl. var. *typicum*, var. *pilosiusculum* Hochr., & f. *racemosum* Hochr., l. c.; Heyne, *Nutt. Pl. Ned. Ind.* ed. 2, 1927, 1219; Doct. van Leeuwen, *Pangrango*, 1933, 209, pl. 20; Steen., *Trop. Natuur* 24, 1935, 142, f. 2, 3 & 5 (phot.); Amsh. in Back., *Bekn. Fl. Java* (em. ed.) 7, 1948, fam. 163, p. 3. — *Thibaudia varingiaefolia* Bl., *Bijdr.* 1826, 860; Hassk., *Cat. Hort. Bot. Bog.* 1844, 161. — *Agapetes vulgaris* Jungh., *Nat. Geneesk. Arch.* N.I. 2, 1845, 34; Hassk., *Flora* 30, 1847, 524; Walp., *Ann.* 1, 1848/49, 475; Jungh., *Java ed.* 2, 1853, 578, 580. — *V. obversum* Miq., *Ann. Mus. Bot. Lugd.-Bat.* 1, 1864, 220. — *Agapetes varingiaefolia* (Bl.) G. Don, *Gen. Syst.* 3, 1834, 862; Dun. in DC., *Prodr.* 7, 1839, 555; Moritz, *Syst. Verz. Zoll.* 1846, 42; Zoll., *Syst. Verz.* 2, 1854, 137. — *V. erythrinum* Hook., *Bot. Mag.* 1852, t. 4688; Planch., *Fl. Serres ser. II*, 1, 1856, t. 1115; Walp., *Ann.* 5, 1858, 440; Ridl., *Fl. Mal. Pen.* 2, 1923, 211. — *Epigynium varingiaefolium* (Bl.) Klotzsch,

Linnaea 24, 1851, 52. — *V. ellipticum* Miq., Fl. Ind. Bat. 2, 1859, 1060, quoad descr. & cit. p. p., cf. Miq., Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 38, nota. — *Diplycosia erythrina* (Hook.) K. & G., J. As. Soc. Beng. 74, ii, 1905, 72; Ridl., J. Fed. Mal. St. Mus. 5, 1914, 39; l. c. 10, 1920, 146. — *V. schimperi* Koord., Exk. Fl. Java 3, 1912, 15, p.p.; Koord.-Schum., Syst. Verz. 1912, fam. 233, p. 111. — *V. sp.*, Koord., Nat. Tijds. N. I. 60, 1901, 264; l. c. 63, 1904, 41.

var. *varingiaefolium*.

SUMATRA. Atjeh, G. Kemiri, 2900—3314 m, *Van Steenis* 9601 (different by subcrenulate leaves). G. Lembuh, bivouac Halfweg, 1850—3000 m, *Van Steenis* 9144. G. Losir, 2700—2800 m, *Van Steenis* 8509. Eastcoast, G. Sinabung, 2470 m, *Lörzing* 8162. Dolok Si Manuk-manuk, R. Si Boeea 11376. G. Pinto, 2210 m, *Lörzing* 13865. Westcoast, G. Singgalang, 1600—2800 m, *Beccari* P. S. 343, 362. G. Merapi, 2600 m, *Schiffner* 2353, 2377. G. Talamau, 2800 m, *Bünne-meijer* s.n. G. Sago-G. Malintang, 1800—1900 m, *Jacobs* 4681. Batang Palupu, 900 m, *Kleinhoonte* 668. Benkulen, G. Pesagi, c. 2165 m, *Forbes* 2039, 2052 a. G. Dempo, 3000 m, *De Voogd* 386. Bt. Daun, 2400 m, *De Voogd* 1404.

MALAY PENINSULA. Perak, G. Bubu, 1525—1920 m, *Kunstler* 7349 (fl. white); *Wray* 3816 (CAL, K); *Strouts* s.n. (SING); *For. Dep. F. M. S.* 30832, 30875 *Symington* (fl. white); no locality given, *Scortechini* s.n. (CAL). Pahang/Selangor, G. Mengkuang Lebak, 1525 m, *Robinson* s.n. (BM, K, SING).

JAVA. Preanger/Djakarta, G. Gedeh, 2000—2900 m, *Blume* s.n. (L, type of *Thibaudia varingiaefolia*); *Zollinger* 1921 p.p., 1921 a p.p.; *Schiffner* 2359; *Scheffer* s.n.; *Van Steenis* 1991, 1993, 17569; *Hallier* 455, 499, 587; *Yates* 2803; *Hub. Winkler* 1819; *Koorders* 15609; *O. Kuntze* 4730; *De Voogd* 739; *Sapei* 2520; *Docters van Leeuwen* 12979; *Brascamp* s.n.; *Clemens* 30385; *Backer* 3299; *Bruggemans* 3729; *Bakhuizen v. d. Brink* 4097; *Lörzing* 2184; *Hochreutiner* 270, 986. G. Salak, (800—)1300—2000 m, *Zollinger* 952 p.p. ('*Agapetes elliptica*'); *Hochreutiner* 1972 (G, lectotype of *V. varingiaefolium* var. *pilosiusculum*); *Lam* 2237; *Van Steenis* 4026; *De Voogd & Bloembergen* s.n.; *Bik* 10. G. Pangrango, 2300—3000 m, *Möller* s.n.; *Hochreutiner* 902; *Van Steenis* 5193, *Wisse* 1102; *Blaauw* s.n.; *Burck* s.n.; *Docters van Leeuwen* 5446; *Van Ooststroom* 13350; *Yates* 2749; *Schiffner* 2381; *Koorders* 15607; *Van Hartevelt* 6216. G. Wayang, 1830—2180 m, *Forbes* 723, 843 a; *Warburg* 3299; *Van Slooten* 321; *Denker* 15; *Hochreutiner* 1566, 1567 (G, type of *V. varingiaefolium* var. *pilosiusculum* f. *racemosum*). G. Papan-dayan, 1800—2400 m, *Gibbs* 6471; *Hochreutiner* 2117; *Backer* 5532; *Van Steenis* 4096, 4145; *Scheffer* s.n.; *Boerlage* s.n.; *Korthals* s.n.; *Koorders* 42839, 42840; *Schiffner* 2365; *Schierbeek* s.n. Telaga Bodas, 1700—2000 m, *Boerlage* s.n.; *Backer* 32676; *Koorders* 40871, 42432; *Koens* 302; *Korthals* s.n.; *Reinwardt* s.n.; *J. J. Smith* s.n.; *Burck* 551. Tangkuban Prahū, 2000—2450 m, *Backer* 32623; *Boerlage* s.n.; *Alston* 12475; *Holstuoogd* 333; *Docters van Leeuwen* 2247; *Anderson* 123 p.p. (A), 124 (K); *Forman* 641; *Wisse* 923; *Gibbs* 6836. G. Tilu, *Junghuhn* s.n. G. Sidanglaya, *Ploem* s.n. G. Mandalawangi, 2800 m, *Junghuhn* s.n. Tjibodas region, *Koorders* 9665, 9666, 13303, 13219, 13220, 15567, 15602, 15605, 15606, 26020, 32106, 32164, 41948, 42050; *Scheffer* s.n.; *Beccari* s.n. Tjigenteng, 1500 m, *Koorders* 33758. Pangentjongan-Galunggung-Telagabodas, 1700—1900 m, *Koorders* 9667 (BO, lectotype of *V. schimperi*), 9671, 9672, 9674, 9676, 13944, 26675. G. Guntur, *Kerkhoven* 6; *Anderson* 481 (K). G. Perbakti, 1800 m, *Van Steenis* 189; *Bakhuizen v. d. Brink* 1734. G. Prahū, 2500 m, *Brinkman* 375. Garut, *Burck* s.n. G. Patuha, 1900 m, *Warburg* 3300; *Hildebrand* 235, 327; *Lörzing* 1331, 1352; *Korthals* s.n.; *De Haan* 18; *Smith & Rant* 381, 382. G. Merbabu, 2900 m, *Docters van Leeuwen* s.n. Kawa Tjiwidi, *Teysmann & Scheffer* s.n. G. Kendang, Kawa Manuk, 1800 m, *Koens* 177, 181; *Schiffner* 2360; *Bakhuizen v. d. Brink* 368; *Rijkevorsel* 55. G. Malabar, *Backer* s.n.; *Anderson* 123 p.p. (K). Locality not given. *Kollmann* s.n.; *E. Meyer* s.n.; *Warburg* 3298, 11067; *Horsfield* s.n.; *Göring* 81, 330; *Forbes* 730; *Leschenault* s.n. Cheribon, G. Tjerimai, top, 3000 m, *Docters van Leeuwen* 2520; *Houter* 1; *Backer* 5087; *V. d. Meer Mohr* 26; *Vermeylen* 70. Pekalongan, G. Slamāt, 3200 m, *Rant* s.n.; *De Monchy* s.n.; *Koorders* 9685; *Backer* 497; *Van Steenis* 11508. Kedu h, G. Sindoro, 3145 m, *Waitz* s.n. (L, lectotype of *V. varingiaefolium* f. *parvifolium*); *Junghuhn* s.n.; *Docters van Leeuwen* 8930; *Koorders* 9684, 11333. G. Merbabu, 2200—3000 m, *Büsgen* 203; *Docters van Leeuwen* s.n.; *Kooper* 237; *Waitz* s.n. (L, type of *V. varingiaefolium*

f. *sublanceolatum*; Junghuhn s.n.; Coert 120, 1597. G. Merapi, 1000 m, Hemken 2632; Coert 125; Den Berger 96. G. Djieng plateau, 2000—2525 m, Koorders 11036, 11232; Teysmann s.n.; Junghuhn s.n.; Van Slooten 380, 405; Meijer 2790; Backer 21693; Docters van Leeuwen 2283; O. Kuntze 5720, 5742; Hochreutiner 2472. G. Sumbing, 2100—3300 m, Boerrigter 76; O. Kuntze 5602 (NY, type of *V. varingiaefolium* var. *angustifolium*); Lörzing 41; Junghuhn s.n.; F.R.I. Ja. 2460; Docters van Leeuwen 8736. Djapara, G. Muria, (600—)1200—1595 m (top), F.R.I. Ja. 1722, 3720; Waitz s.n.; Docters van Leeuwen 844; Teysmann s.n.; Kostermans 6316. Madiun, G. Wilis, 2500 m, Koorders 9688; F.R.I. Ja. 3042; Backer 11538; Lörzing 951; *ibid.*, Ngebel region, 2000 m, Koorders 9687. G. Lawu, 1500—3265 m, Coert 1055; Jacobson s.n.; Docters van Leeuwen 8143; Van Slooten 2550; Kostermans 6380 A; Buwalda 8137; Junghuhn s.n.; Elbert 327—331; De Voogd 740. Malang, G. Tengger, 2000—2800 m, Beumée A 644; Teysmann s.n.; Koorders 37517—37520; Van Slooten 2358; Jeswiet 600; Wisse 506; Backer 37415; Mousset 1165; Kobus s.n.; Dorgelo 1329; Hochreutiner 2748. Tosari, 1800—2750 m, Bijhouwer 123; F.R.I. Ja. 2852; Kobus s.n. G. Kawi, 2600—2850 m, Docters van Leeuwen 12213; Arens 109. Pasuruan, near Metigi, Teysmann s.n. (BO; U, type of *V. obversum*). G. Ardjuno, 2700 m, Jeswiet s.n.; Rant s.n. G. Welirang, 3100 m, Backer 36213. Besuki, Idjen plateau, 2160—2200 m, Koorders 9689, 43170; Backer 25316. G. Argopuro, 2852 m, Zollinger 1921 p.p., 1921 a p.p. G. Hijang, 2300 m, Koorders 43415; Backer 9818. 'prope Sedatu', Korthals s.n. (L, syntype of *V. varingiaefolium* var. *parvifolium*). Cult. Hort. Rollison. (K, type of *V. erythrinum*).

BALL. G. Agung, 3100 m, Arens 14 (L).

var. *calcaratum* Sleum., nov. var. — Corolla rosacea. Antherae dorso longius vel brevius bicalcaratae, basi saepius in apiculum obtusum contractae. Tubuli saepius quam in var. *varingiaefolio* angustiores.

SUMATRA. Atjeh, top of G. Lembuh to bivouac Halfweg, 2500 m, Van Steenis 9015 (A, BO, K; L, type; SING), on ridge in scrub forest, fl. 19-2-1937; *ibid.*, 1850—3000 m, Van Steenis 9145. G. Losir, 2250—3450 m (top), Van Steenis 8475, 8571, 8605. G. Kemiri, 2900—3314 m, Van Steenis 9652. Near Lau Alas R., 1800—2500 m, Van Steenis 8715 (BO). Putjuk Angasan, 2500 m, Van Steenis 8384 (BO), 8385 (BO). East coast, G. Sinabung-Berastagi, For. Dep. F.M.S. 24667 Symington.

var. *orientale* (Hochr.) Sleum., nov. comb. — *V. lucidum* (Bl.) Miq. var. *orientale* Hochr., Candollea 2, 1925, 499. — *V. schimperi* Koord., Exk. Fl. Java 3, 1912, 15, p.p., fig. 4, repr. from Schimper, Pflanzengeogr. 1898, 767, fig. 426 (sub *V. 'myrtoides'*).

JAVA. Malang, G. Smeru, 2700 m, Hochreutiner 2682 (G, syntype of *V. lucidum* var. *orientale*); Gisius 61; Kraksaan, F.R.I. Ja. 2998. G. Ardjuno, 2500—2700 m, Lauterbach 6140; Koorders 38028, 43775, 43809; Van Steenis 7041, 7079; Wurth 1, 2; Backer 36225; De Voogd 741; Arens 38; Rademacher s.n.; Posthumus 328. G. Tengger, 2250—2750 m, De Voogd 735; De Haan 140; Kreulen 142; Van Slooten 2359; Blaauw s.n. Besuki, in summo Montis Argopuro, prope Bondowosso, 2800 m, Zollinger 2957 (BM, BO, FI; G, lectotype of *V. lucidum* var. *orientale*; MEL, P); *ibid.*, 2865—3000 m, Zollinger 710 (P); Jeswiet 345; Koorders 43576. G. Hijang, 3000—3090 m, Wurth s.n.; Backer 9723; Koorders 43585. Kawa Idjen, 1800—2950 m, Koorders 9690, 14737, 14738, 43169; Van Steenis 12158; De Vriese & Teysmann s.n.; Clason-Laarman 956; Buwalda 7384.

7. Sect. *Nesococcus* Copel. f., Philip. J. Sc. 42 (4), 1930, 549. — *V. sect. Euepigynium* Schltr, Bot. Jahrb. 55, 1918, 174 p.p., nom. subnud.; Sleum., l. c. 71, 1941, 420 (lectotype sp.: *V. filipes* Schltr); l. c. 72, 1942, 241, nec sect. *Epigynium* (Kl.) Hook. f. (1876) p.p., nec *Epigynium* Kl. (pro gen. 1851) p.p.

Type species: *V. philippinense* Warb.



## Key to the species

- 1.a. Corolla split deeply (to c.  $\frac{1}{2}$  or more) in 5(—7) erect or slightly reflexed lobes . . . . . 2
- b. Corolla shortly (up to  $\frac{1}{3}$ , or mostly less deeply) 5(—7, rarely —8)-lobed, the lobes ( $\pm$  broad and obtuse) generally conspicuously reflexed in anthesis . . . . . 13
- 2.a. Corolla lobes rather broad . . . . . 3
- b. Corolla lobes narrow to almost subulate . . . . . 8
- 3.a. Anthers provided with 2 distinct dorsal spurs (1 mm). *Celebes* 118. *V. latissimum* . . . . . 4
- b. Anthers with minute or no dorsal spurs . . . . . 7
- 4.a. Filaments and style glabrous . . . . . 5
- b. Filaments and style hairy . . . . . 7
- 5.a. Racemes contracted; rhachis up to 0,5 cm. *Celebes* . . . . . 119. *V. contractum* . . . . . 6
- b. Racemes not contracted; rhachis at least 1,5 cm . . . . . 6
- 6.a. Leaves 5—8 by 3—4,5 cm. Rhachis 4—6(—7) cm. *Celebes* 120. *V. warburgii* . . . . . 6
- b. Leaves 11—16 by (4,5—)5—6,5 cm. Rhachis 1,5—2 cm. *Celebes* 121. *V. aucupis* . . . . . 6
- 7.a. Calyx tube puberulous. *New Guinea* . . . . . 122. *V. minuticalcaratum* f. *minuticalcaratum* . . . . . 6
- b. Calyx tube glabrous. *New Guinea* . . . . . 122. *V. minuticalcaratum* f. *glabrum* . . . . . 9
- 8.a. Corolla subdensely hairy outside . . . . . 9
- b. Corolla practically glabrous outside . . . . . 10
- 9.a. Disk glabrous. *New Guinea* . . . . . 123. *V. quinquefidum* var. *quinquefidum* . . . . . 10
- b. Disk laxly hirsutulous. *New Guinea* . . . . . 123. *V. quinquefidum* var. *oranjense* . . . . . 10
- 10.a. Leaves obovate to elliptic-obovate, apex obtuse to rounded. *New Guinea* . . . . . 124. *V. brachygynae* . . . . . 11
- b. Leaves other than obovate, apex  $\pm$  acuminate . . . . . 11
- 11.a. Leaves subovate-oblong to lanceolate, apex subcaudate-acuminate. *New Guinea* . . . . . 125. *V. paradisearum* . . . . . 12
- b. Leaves elliptic to oblong-elliptic, apex shortly acuminate . . . . . 12
- 12.a. Corolla glabrous inside. Tubules less than half as long as the thecae. *New Guinea* . . . . . 126. *V. megalophyes* . . . . . 12
- b. Corolla densely short-hairy inside. Tubules as long as the thecae. *New Guinea* . . . . . 127. *V. stenolobum* . . . . . 12
- 13.a. Anthers (thecae and/or tubules) provided with a few  $\pm$  spreading gland-tipped hairs or shortly stalked glands, or with a few sessile point-like, generally dark coloured glands . . . . . 14
- b. Anthers (thecae and tubules) bearing no such glands or gland-tipped hairs . . . . . 58
- 14.a. Leaves  $\pm$  distinctly cordate . . . . . 15
- b. Leaves occasionally or in part in the same specimen subcordate, generally cuneate to rounded at the base . . . . . 18
- 15.a. Inflorescences densely short-pubescent, the corolla excepted . . . . . 16
- b. Inflorescences glabrous . . . . . 17
- 16.a. Corolla depressedly subglobose-urceolate, 5—6 by 6—7 mm. *New Guinea* . . . . . 128. *V. otophyllum* . . . . . 19
- b. Corolla tubular-urceolate, (10—)12—15 by 5—6 mm. *Borneo* 129. *V. cordifolium* . . . . . 19
- 17.a. Corolla oblong-urceolate, widest in the middle, 10—12 by 3—4 mm. *Borneo* . . . . . 130. *V. cercidifolium* . . . . . 19
- b. Corolla urceolate, constricted in the middle, 7,5 by 4—5 mm. *New Guinea* . . . . . 131. *V. appendiculatum* . . . . . 19
- 18.a. Style glabrous or practically so . . . . . 19
- b. Style hairy at least in the lower third . . . . . 37
- 19.a. Calyx lobes (all, or rarely at least for their greater number) provided with a generally distinct (mostly thick) apical gland and/or with a row of smaller, sessile or subsessile (sometimes early caducous) marginal glands . . . . . 20
- b. Calyx lobes showing no such glands . . . . . 34
- 20.a. Calyx 4—6 mm long in all, 5—6 mm in diam. at the limb in flowering time. Mature fruit 1—1,3 cm in diam. *Sumatra, Java, Bali* . . . . . 132. *V. korthalsii* . . . . . 21
- b. Calyx up to 3,5 mm long in all, and up to 4 mm in diam. at the limb in flowering time. Mature fruit, as far as known, up to 6 mm in diam. . . . . 21
- 21.a. Pedicels  $\pm$  2 cm in anthesis. *Ceram* . . . . . 133. *V. tentaculatum* . . . . . 22
- b. Pedicels up to 1,3 cm in anthesis . . . . . 22
- 22.a. Calyx tube densely glandular-muriculate. *New Guinea* . . . . . 134. *V. muriculatum* . . . . . 22

- b. Calyx tube pubescent or glabrous, sometimes also very sparsely glandular-muriculate . . . . . 23
- 23.a. Tubules transversely cut apically, their back wall not extended into 1 or 2 teeth, the pore  $\pm$  round . . . . . 24
- b. Tubules (very) obliquely cut distally, their back wall  $\pm$  extended into 1 or 2 teeth, the pore elliptic to subovate . . . . . 25
- 24.a. Leaves crenulate, 0,6—2 by 0,3—0,8 cm. *Borneo* . . . . . 156. *V. coriaceum*
- b. Leaves entire, 3,5—5,5 by 1,5—2 cm. *Mindanao* . . . . . 135. *V. elegans*
- 25.a. Back wall of each tubule extended distally into an erect beak which is as long as or mostly longer than the proper tube of the tubule . . . . . 26
- b. Back wall or each tubule extended distally into a short, sometimes bifid, erect or not rarely horizontally directed or even reflexed tooth . . . . . 29
- 26.a. Calyx limb very low, wavy, the lobes irregular, hardly properly indicated as such, i. e. merely in form of apical glands. *New Guinea* . . . . . 136. *V. goodenoughii*
- b. Calyx limb at least 0,5 mm high, the lobes regular, markedly distinct as such . . . . . 27
- 27.a. Calyx lobes broadly ovate-deltoid, apex roundish-obtuse. *New Guinea* . . . . . 137. *V. hellwigianum*
- b. Calyx lobes  $\pm$  deltoid, apex subacute . . . . . 28
- 28.a. Calyx lobes c. 0,5 mm. Leaves elliptic or subovate-elliptic, apex shortly, sub-acutely or obtusely acuminate, 4,5—6 by 2,3—3 cm. *New Guinea* . . . . . 138. *V. psammogenes*
- b. Calyx lobes c. 1 mm. Leaves lanceolate or rarely elliptic-lanceolate, apex caudate-acuminate, 5—7 by 1,4—2 cm. *New Guinea* . . . . . 139. *V. longiporum*
- 29.a. Marginal glands of the leaves restricted to 1 or 2 basal (or a little suprabasal) pair(s) . . . . . 30
- b. Leaves provided with several remote, distinctly or more obscurely impressed glands or glandular points along the whole margin . . . . . 32
- 30.a. Leaves 2—3 by 1—1,7 cm. *New Guinea* . . . . . 140. *V. acutissimum* var. *acutissimum*
- b. Leaves (4—)5—9(—10) by (1,5—)2—3(—4) cm . . . . . 31
- 31.a. Leaves 5—7(—9)-plinerved. Corolla elongate, narrowly urceolate. *New Guinea* . . . . . 141. *V. carneolum* var. *carneolum*
- b. Leaves sub-5-plinerved. Corolla subventricose-urceolate. *New Guinea* (*Louisiade Arch.*) . . . . . 141. *V. carneolum* var. *nesophilum*
- 32.a. Corolla (8—)9—10(—11) mm. (Calyx and pedicel glabrous.) *New Guinea* . . . . . 142. *V. albicans* var. *albicans*
- b. Corolla up to 7 mm . . . . . 33
- 33.a. Calyx and pedicels glabrous. *New Guinea* . . . . . 142. *V. albicans* var. *pseudopsammogenes*
- b. Calyx and pedicels laxly short-pubescent. *New Guinea* . . . . . 142. *V. albicans* var. *pubens*
- 34.a. Corolla broad-urceolate or subcampanulate (may be a little constricted in the lower part initially) . . . . . 35
- b. Corolla narrow-conical or tubular-urceolate (never constricted at or below the middle initially) . . . . . 36
- 35.a. Leaves elliptic or oblong- to lanceolate-elliptic, base cuneate to broadly attenuate, the very base swollen or dilated, bearing a conspicuous marginal gland on each side. *New Guinea* . . . . . 143. *V. daphniphyllum*
- b. Leaves ovate or oblong-ovate, base rounded to broadly attenuate, the very base not dilated, the pair of marginal glands rather inconspicuous. *New Guinea* . . . . . 144. *V. convallariiflorum*
- 36.a. Corolla at least 9 mm. *New Guinea* . . . . . 145. *V. viridiflorum*
- b. Corolla 6—7 mm. *New Guinea* . . . . . 139. *V. longiporum*
- 37.a. Axillary buds very conspicuous . . . . . 38
- b. Axillary buds, if any, (very) small . . . . . 47
- 38.a. Axillary buds almost globular, 2—3 mm in diam., the perulae broadly ovate and obtuse, or suborbicular . . . . . 39
- b. Axillary buds  $\pm$  ovoid-oblongoid, at least 3 by 2 mm, the perulae stipule-like, ovate-lanceolate or subsubulate,  $\pm$  acute . . . . . 42
- 39.a. Rhachis and pedicels glabrous . . . . . 40
- b. Rhachis and pedicels generally subdensely, rarely laxly short-pubescent, or sub-tomentose . . . . . 41

- 40.a. Pedicels rather robust, (1—)1,5—2(—3) mm. Calyx lobes conspicuous. *Borneo*  
146. *V. simulans* var. *simulans*  
b. Pedicels slender, (3—)4—6 mm. Calyx lobes rather inconspicuous. *Borneo*  
146. *V. simulans* var. *leptopodium*
- 41.a. Inflorescence 3—3,5 cm. Corolla 4(—5) mm. *Borneo* . . . 147. *V. mjoebergii*  
b. Inflorescence 4—6(—9) cm. Corolla 8—9 mm. *Borneo* . . . 148. *V. pachydermum*
- 42.a. Corolla 9—12 mm . . . . . 43  
b. Corolla 6—8 mm . . . . . 44
- 43.a. Leaves 2—4 by 1,3—2,5(—3) cm. *Borneo* . . . . . 149. *V. elliptifolium*  
b. Leaves 4,5—9,5 by 2,5—4,3 cm. *Borneo* . . . . . 150. *V. endertii*
- 44.a. Petiole much flattened, 1—4 by 2—4 mm. *Mindanao* (*Camiguin de Misamis*)  
151. *V. camiguinense*  
b. Petiole less or hardly flattened, more slender, 1—6 by 1—1,5 mm . . . . . 45
- 45.a. Leaves apex broad-attenuate and obtuse, or rounded. *Borneo* 152. *V. clementis*  
b. Leaves apex more narrowly subacuminate-attenuate, the very tip obtuse . . . . . 46
- 46.a. Calyx glabrous. *Mindanao, Palawan* . . . 153. *V. palawanense* var. *palawanense*  
b. Calyx ± densely hairy. *Palawan* . . . 153. *V. palawanense* var. *foxworthii*
- 47.a. Calyx lobes provided with a conspicuous thick apical gland, but with no row of smaller marginal sessile glands . . . . . 48  
b. Calyx lobes whether or not provided with a very small (or inconspicuous) apical gland and/or a row of small, sessile marginal glands, or without any such glands at all . . . . . 50
- 48.a. Corolla (9—)10—12 mm. *New Guinea* . . . . . 154. *V. cornigerum*  
b. Corolla up to 8 mm . . . . . 49
- 49.a. Leaves ovate-acuminate, coriaceous, 2,3—3 by 1—1,7 cm. *New Guinea*  
140. *V. acutissimum* var. *pilosistylum*  
b. Leaves oblong or elliptic-oblong, sometimes lanceolate- or subovate-oblong, apex obtuse to rounded, subcoriaceous, 2—4 by (0,5—)0,8—1(—1,5) cm. *Timor, Alor, Flores, Sumba, S. Celebes*  
90. *V. timorense*
- 50.a. Leaves (oblong-obovate, 1,8—3 by 0,6—1,1 cm) retuse for c. 1 mm. *Sumatra*  
155. *V. besagiense*  
b. Leaves faintly or generally not retuse . . . . . 51
- 51.a. Leaves up to 2 by 0,8 cm . . . . . 52  
b. Leaves at least 2,5 by 1 cm . . . . . 54
- 52.a. Leaves distinctly crenulate along the whole margin, (0,6—)0,7—1,3 by (0,3—)0,4—0,5 cm. *Borneo* . . . . . 156. *V. coriaceum*  
b. Leaves entire, or with 1 or 2 pairs of marginal glands at intervals in the lower half of the lamina . . . . . 53
- 53.a. Corolla 5—6 mm. *Borneo* . . . . . 157. *V. stapfianum* var. *stapfianum*  
b. Corolla 2,5—3 mm. *Borneo* . . . . . 157. *V. stapfianum* var. *minus*
- 54.a. Corolla 9—10 by 3—4(—5) mm. *New Guinea* . . . . . 158. *V. horizontale*  
b. Corolla (5—)6—7(—8) by 2,5(—3) mm . . . . . 55
- 55.a. Calyx lobes very short, obtuse, fleshy, the calyx limb often merely wavy, hardly properly lobed. (Leaves narrow-elliptic to lanceolate, apex longer or shorter acuminate.) *Malay Peninsula* . . . . . 159. *V. bancanum* var. *kunstleri*  
b. Calyx lobes distinct, ovate-deltoid, rather thin . . . . . 56
- 56.a. Calyx lobes rarely bearing one marginal caducous gland on each side, or mostly no such glands at all. Leaves in general elliptic or oblong-, rarely subovate-elliptic. *Sumatra, Banka, Billiton, Borneo* . . . 159. *V. bancanum* var. *bancanum*  
b. Calyx lobes bearing a row of several sessile, rather persistent marginal glands on each side . . . . . 57
- 57.a. Leaves in general elliptic- or oblong-lanceolate, subcaudate-acuminate. *Sumatra, Java, Bali, Borneo* . . . . . 159. *V. bancanum* var. *tenuinervium*  
b. Leaves ovate-elliptic, shortly obtusely acuminate. *Borneo*  
159. *V. bancanum* var. *kemulense*
- 58.a. Rhachis provided with gland-tipped spreading hairs (which are mostly found also on the branchlets, but rarely on the pedicels) . . . . . 59  
b. Rhachis (and branchlets) never bearing such gland-tipped hairs . . . . . 60
- 59.a. Leaves elliptic or oblong-elliptic, apex shortly obtusely acuminate. Racemes 7—9(—10) cm. *Philippines* . . . . . 160. *V. luzoniense*



- b. Leaves ovate to lanceolate, apex shortly (sub)caudate-acuminate. Racemes (2—) 3—5 cm. *Philippines* . . . . . 161. *V. tenuipes*
- 60.a. Corolla exclusively laxly glandular-muriculate outside . . . . . 61  
 b. Corolla hairy, or hairy and glandular-muriculate (only in 163. *V. mollissimum*), or glabrous outside . . . . . 63
- 61.a. Leaves 0,8—1,3 by 0,4—0,7 cm. *Celebes* . . . . . 212. *V. tomicipes*  
 b. Leaves exceeding 3,5 by 1 cm . . . . . 62
- 62.a. Leaves lanceolate to elliptic-lanceolate, apex long subcaudate-acuminate. *New Guinea* . . . . . 162. *V. filipes*  
 b. Leaves obovate to obovate-subspathulate, sometimes suborbicular- or oblong- or elliptic-obovate, apex  $\pm$  rounded. *New Guinea* . . . . . 218. *V. acrobracteatum*
- 63.a. Corolla at least initially  $\pm$  densely short-hairy outside . . . . . 64  
 b. Corolla glabrous outside (some hairs may occur on the corolla in bud stage, or at the lobes) . . . . . 70
- 64.a. Corolla distinctly widened towards the mouth, i. e. campanulate or subcylindric-campanulate . . . . . 65  
 b. Corolla equally wide at both ends or narrowed towards the mouth, i. e. urceolate to tubular . . . . . 66
- 65.a. Corolla 4—4,5 mm, pubescent and glandular-muriculate outside. *New Guinea* . . . . . 163. *V. mollissimum*  
 b. Corolla 5—6 mm, exclusively pubescent outside. *New Guinea* . . . . . 164. *V. molle*
- 66.a. Corolla (8—)9—10 by 4 mm. *Borneo* . . . . . 165. *V. costerifolium*  
 b. Corolla up to 7 by 2,5—3 mm . . . . . 67
- 67.a. Anthers (thecae plus tubules) 1—1,5 mm . . . . . 68  
 b. Anthers (thecae plus tubules) 2,5—3 mm . . . . . 69
- 68.a. Style densely hirsutulous. *Palawan* . . . . . 166. *V. brachytrichum*  
 b. Style glabrous. *New Guinea* . . . . . 232. *V. striicaule* var. *pubiflorum*
- 69.a. Leaves 3—5(—6,5) by 2—3,3 cm,  $\pm$  pubescent beneath at least initially. *Sumatra* . . . . . 167. *V. rigidifolium*  
 b. Leaves 1,8—2,5(—3,5) by 1,1—1,5(—2) cm, epilose from the begin. *New Guinea* . . . . . 168. *V. summifaucis*
- 70.a. Filaments completely glabrous . . . . . 71  
 b. Filaments hairy at least at the base . . . . . 72
- 71.a. Leaves 9—13 by 5—10 cm. Racemes 8—15-flowered; rhachis 0,5—2 cm. Anthers with 2 dorsal spurs. *Celebes* . . . . . 118. *V. latissimum*  
 b. Leaves (3—)4—6 by 2—3(—3,5) cm. Racemes many-flowered; rhachis 4—7 cm. Anthers not spurred dorsally. *Celebes* . . . . . 169. *V. cuneifolium*
- 72.a. Calyx lobes bearing a distinct, generally thick apical gland (which sometimes may be covered by hairs) and/or a row of several minor ( $\pm$  sessile) marginal glands . . . . . 73  
 b. Calyx lobes bearing a minute and inconspicuous apical gland, or mostly no trace of any apical or marginal glands . . . . . 120
- 73.a. Calyx lobes bearing a  $\pm$  thick apical gland, but no row of minor marginal glands . . . . . 74  
 b. Calyx lobes besides a small or rather inconspicuous (or no) apical gland, bearing a row of minor, sessile or subsessile, yellowish marginal glands . . . . . 114
- 74.a. Leaves remotely (sub)crenulate, i. e. set with several conspicuous glands along the whole margin or at least in the lower  $\frac{2}{3}$  of the margin on each side . . . . . 75  
 b. Leaves practically entire, i. e. set with 1 or 2 (rarely 3) basal or suprabasal marginal  $\pm$  impressed glands on each side, which are restricted to the lower third, or very rarely to the lower half of the lamina . . . . . 83
- 75.a. Style pubescent. *Timor, Alor, Flores, Sumba, S. Celebes* . . . . . 90. *V. timorense*  
 b. Style glabrous . . . . . 76
- 76.a. Anthers provided with 2 very distinct dorsal spurs. *Philippines* . . . . . 170. *V. vidalii*  
 b. Anthers provided with very short, subinconspicuous dorsal spurs or knobs, or generally without any trace of them . . . . . 77
- 77.a. Calyx tube densely set with short hairs and muriculate glands . . . . . 78  
 b. Calyx tube glabrous . . . . . 79
- 78.a. Leaves elliptic or subovate-elliptic, apex subabruptly acuminate for 0,5—1 cm, 2—2,5(—2,8) cm wide. *New Guinea* . . . . . 171. *V. amphoterum*  
 b. Leaves elliptic to oblanceolate-elliptic, apex shortly and broadly attenuate or sub-acuminate, generally obtuse, rarely subacute, (0,8—)1—1,6 cm wide. *Philippines* . . . . . 172. *V. banksii*

- 79.a. Disk glabrous . . . . . 80  
 b. Disk sparsely or mostly  $\pm$  densely short-pubescent . . . . . 81
- 80.a. Corolla 5 by 2.5 mm. *Talaud Isl.* . . . . 173. *V. apophysatum*  
 b. Corolla (8—)9—10(—11) by 3—4 mm. *New Guinea* . . . . . 142. *V. albicans* var. *albicans*
- 81.a. Leaves elliptic to obovate-elliptic, sometimes obovate, apex  $\pm$  obtuse. *Philippines* . . . . . 174. *V. woodianum*  
 b. Leaves narrow-elliptic, elliptic-oblong or narrowly elliptic-obovate, apex  $\pm$  acuminate . . . . . 82
- 82.a. Calyx lobes well developed. *Philippines* . . . . . 175. *V. cumingianum* var. *pyriforme*  
 b. Calyx lobes  $\pm$  obscure. *Philippines* . . . . . 175. *V. cumingianum* var. *igorotorum*
- 83.a. Style pubescent at least in the lower part . . . . . 84  
 b. Style quite glabrous . . . . . 86
- 84.a. Leaves 2—4 by (0.5—)0.8—1(—1.5) cm. *Timor, Alor, Flores, Sumba, S. Celebes* . . . . . 90. *V. timorensis*  
 b. Leaves larger . . . . . 85
- 85.a. Leaves ovate, apex caudate-acuminate, 6.5—10 by 1.8—3.7 cm. *New Guinea* . . . . . 176. *V. gracile*  
 b. Leaves elliptic, (3—)4—7 by (1.3—)2—3 cm. *New Guinea* . . . . . 177. *V. tubiflorum*
- 86.a. Calyx tube winged, the 5 wings or ribs extending into the calyx lobes. *New Guinea* . . . . . 178. *V. debilescens*  
 b. Calyx tube obscurely or mostly not winged or angled . . . . . 87
- 87.a. Anthers distinctly 2-spurred dorsally (spurs almost as long as the tubules). *New Guinea* . . . . . 179. *V. minusculum*  
 b. Anther spurs, if any, mostly rudimentary, or certainly much shorter than the tubules . . . . . 88
- 88.a. Tubules slender, (much) narrower than, and as long as or longer than the thecae . . . . . 89  
 b. Tubules  $\pm$  as wide and rarely as long as, generally (much) shorter than the thecae, or, if slender, distinctly shorter than the thecae . . . . . 95
- 89.a. Leaves  $\pm$  obovate, set with thickish glandular or almost resinous points underneath . . . . . 90  
 b. Leaves of other form, i.e. not decidedly obovate, the undersurface set with caducous glandular muriculate hairs or their bases, or with minute glandular points, or quite glabrous . . . . . 91
- 90.a. Pedicels rather slender, (3—)4—6 mm. Apical gland of the calyx lobes (if any) minute, subglobular. *Malay Peninsula* . . . . . 180. *V. viscifolium* var. *viscifolium*  
 b. Pedicels robust, 1.5—2(—3) mm. Apical gland of the calyx lobes thick, broadly subglobular or mostly somewhat broadened marginally to each side. *Malay Peninsula* . . . . . 181. *V. loranthiflorum*
- 91.a. Rhachis, pedicels and calyx tube short-pubescent. *Mindanao* . . . . . 226. *V. pseudocaudatum*  
 b. Rhachis, pedicels, and calyx tube quite glabrous . . . . . 92
- 92.a. Corolla subdensely short-hairy in the lower half inside. (Leaves (5—)6—10 by (1.5—)2—3(—4.8) cm.) *Philippines* . . . . . 227. *V. benguetense*  
 b. Corolla quite glabrous inside . . . . . 93
- 93.a. Leaves 7—15 by (1—)1.2—3 cm. *New Guinea* . . . . . 182. *V. scandens*  
 b. Leaves up to 7 by 3.5 cm . . . . . 94
- 94.a. Reticulation of the leaves rather conspicuous. Apical gland of the calyx lobes thick, well perceptible. Stamens remaining included at full anthesis. *Malay Peninsula, Sumatra, Java, Banka?* . . . . . 183. *V. littoreum*  
 b. Reticulation of the leaves rather faint or obscure. Apical gland of the calyx lobes (if any) minute. Stamens a little exerted at full anthesis. *Philippines* . . . . . 228. *V. caudatum*
- 95.a. Pedicels very slender to almost filiform, (1—)1.4—1.6 cm . . . . . 96  
 b. Pedicels slender to robust, and shorter in general (rarely up to 2 cm) . . . . . 98
- 96.a. Rhachis  $\pm$  densely, base of the pedicels laxly hairy. (Leaves 1.5—2.5 by 0.5—0.9 cm.) *New Guinea* . . . . . 184. *V. artum*  
 b. Rhachis and pedicels completely glabrous . . . . . 97
- 97.a. Leaves (2.5—)3—4.5 by 1—1.5 cm. *New Guinea* . . . . . 185. *V. habbemae* var. *habbemae*  
 b. Leaves 1.2—2 by 0.6—1.1 cm. *New Guinea* . . . . . 185. *V. habbemae* var. *parvifolium*
- 98.a. Petiole robust (1.5—2 mm in diam.), at least 1 (and up to 2) cm . . . . . 99

- b. Petiole shorter, rarely robust, mostly more slender . . . . . 100
- 99.a. Corolla 0,9—1(—1,2) cm. *Philippines* . . . . . 186. *V. perrigidum*  
 b. Corolla 0,6 cm. *Borneo* . . . . . 187. *V. retivenium*
- 100.a. Corolla abruptly saccate-widened at the base. *New Guinea* 188. *V. angulatum*  
 b. Corolla not or hardly widened at the base . . . . . 101
- 101.a. Leaves small, up to 4 by 1,8 cm . . . . . 102  
 b. Leaves larger in general, at least for the greater part in the same specimen . 106
- 102.a. Leaves lanceolate to narrow-oblong or -elliptic, (0,5—)0,7—1,5 cm wide . . 103  
 b. Leaves of other form, or at least in part in the same specimen exceeding 1,5 cm in width . . . . . 104
- 103.a. Calyx lobes well developed, c. 1 mm. *Philippines*  
 175. *V. cumingianum* var. *marivelesense*  
 b. Calyx lobes obscure, only marked by an apical gland. *Philippines*  
 175. *V. cumingianum* var. *cumingianum*
- 104.a. Calyx tube glabrous. *New Guinea* . . . . . 189. *V. angienae*  
 b. Calyx tube pubescent and glandular-muriculate, or exclusively pubescent . . 105
- 105.a. Calyx tube pubescent and glandular-muriculate. *New Guinea* 171. *V. amphoterum*  
 b. Calyx tube exclusively subdensely pubescent. *New Guinea* 190. *V. cruentum*
- 106.a. Calyx tube pubescent and glandular-muriculate. *New Guinea* 171. *V. amphoterum*  
 b. Calyx tube exclusively pubescent, or glabrous . . . . . 107
- 107.a. Leaves  $\pm$  shortly and broadly, in general  $\pm$  obtusely attenuate or acuminate at the apex . . . . . 108  
 b. Leaves  $\pm$  caudate-acuminate and  $\pm$  acute at the apex . . . . . 111
- 108.a. Corolla subventricose-cylindric or barrel-shaped, 10—11 by c. 5 mm . . . 109  
 b. Corolla urceolate-cylindric, 4—10 by 2—4 mm . . . . . 110
- 109.a. Calyx tube glabrous. *Philippines* . . . . . 191. *V. alvarezii* var. *alvarezii*  
 b. Calyx tube short-pubescent. *Philippines* . . . . . 191. *V. alvarezii* var. *moisense*
- 110.a. Corolla 4(—5) mm. *New Guinea* . . . . . 192. *V. cavendishoides*  
 b. Corolla 7—10 mm. *Sumatra* . . . . . 223. *V. laurifolium* var. *glanduligerum*
- 111.a. Corolla 4(—5) mm. *New Guinea* . . . . . 192. *V. cavendishoides*  
 b. Corolla 6—8 mm . . . . . 112
- 112.a. Corolla cylindric below, subabruptly contracted and much narrower in the upper third. *Philippines* . . . . . 193. *V. irigaense*  
 b. Corolla urceolate or cylindric-urceolate, gradually contracted upwards . . . 113
- 113.a. Corolla thin, greenish-white. *New Guinea* . . . . . 194. *V. fraternum*  
 b. Corolla fleshy, deep rose to purple. *New Guinea* 232. *V. stricaule* var. *adenodes*
- 114.a. Anthers deeply bipartite, i. e. the thecae connate with each other, resp. with the filament but at the very base. Leaves (6—)8—13(—14) by (3—)4—7,5(—8,5) cm. *Borneo* . . . . . 195. *V. claoxylon*  
 b. Anthers bipartite up to halfway, i. e. the thecae connate with each other for their (almost) full length . . . . . 115
- 115.a. Leaves 6—9(—11) by 2—3,5(—4) cm. *Philippines* . . . . . 196. *V. halconense*  
 b. Leaves 0,7—5(—6,5) cm in length . . . . . 116
- 116.a. Pedicels very slender, 1—1,5 cm. (Leaves (2,5—)3—4,5 by 1—1,5 cm.) *New Guinea* . . . . . 185. *V. habbema* var. *pluriglandulosum*  
 b. Pedicels slender or more robust, up to 0,7 cm . . . . . 117
- 117.a. Calyx tube and lobes densely puberulous and laxly glandular-muriculate. (Leaves 2,4—3,9 by 1,3—2,2 cm.) *New Guinea* . . . . . 197. *V. roseiflorum*  
 b. Calyx tube and lobes exclusively pubescent . . . . . 118
- 118.a. Leaves (7—)8—10 by 2,5—3 mm. *Borneo* . . . . . 198. *V. leptocladum*  
 b. Leaves much larger . . . . . 119
- 119.a. Leaves 2,2—3(—3,5) by 0,5—0,8(—1) cm. *Borneo* . . . . . 199. *V. phillyreoides*  
 b. Leaves 3—5(—6,5) by 2—3,3 cm. *Sumatra* . . . . . 167. *V. rigidifolium*
- 120.a. Leaves deeply cordate at the base, the basal lobes amplexicaul . . . . . 121  
 b. Leaves shallowly cordate at the base (the basal lobes never amplexicaul), or cuneate to rounded at the base . . . . . 122
- 121.a. Corolla shortly campanulate-urceolate, 6—7 by 8 mm. *New Guinea*  
 200. *V. amplexicaule*  
 b. Corolla subglobose-urceolate, c. 5 by 4 mm. *New Guinea* 201. *V. hooglandii*
- 122.a. Corolla subglobose, or subglobular- or conical-urceolate . . . . . 123



- b. Corolla (narrowly to broadly) urceolate, or barrel-shaped, or tubular (= cylindric), resp. tubular-urceolate, very rarely subcampanulate-cylindric . . . 127
- 123.a. Corolla 8—10(—12) mm . . . 124
- b. Corolla up to 6 mm . . . 125
- 124.a. Leaves  $\pm$  elliptic, slightly retuse, 1,5—2,3 by (0,8—)1—1,5 cm. *New Guinea* 202. *V. stellae-montis*
- b. Leaves obovate, apex rounded-obtuse, 6,5—7,3 by 3,1—3,4 cm. *New Guinea* 203. *V. lageniforme*
- 125.a. Leaves (1,5—)2—3 cm wide. Branchlets quite glabrous. *New Guinea* 204. *V. crassistylum*
- b. Leaves 0,7—1,4 cm wide. Branchlets  $\pm$  densely and shortly (hispid-) pubescent in the younger parts . . . 126
- 126.a. Racemes reduced to an umbel-like inflorescence with 2—3 flowers, or even to a solitary flower, coming from the top of a very short ( $\pm$  2 mm) peduncle. *New Guinea* 205. *V. brevipedunculatum*
- b. Racemes laxly 10—15-flowered; rhachis 4—6 cm. *New Guinea* 206. *V. longepedicellatum*
- 127.a. Style pubescent at least below, mostly so up to the lower  $\frac{3}{4}$  . . . 128
- b. Style quite glabrous . . . 138
- 128.a. Leaves apex  $\pm$  rounded, or broadly attenuate and obtuse, or slightly retuse . . . 129
- b. Leaves apex  $\pm$  acuminate, acute, or at least subacute . . . 131
- 129.a. Corolla 11(—12) mm. *Moluccas (Buru, Ceram)* 207. *V. retusifolium*
- b. Corolla up to 9 mm . . . 130
- 130.a. Leaves (1—)1,5—2,5 by 0,6—1,2 cm. *Sumatra, Java, Bali, Lombok, W. Flores, Celebes* 116. *V. lucidum* var. *lucidum*
- b. Leaves 6—9(—11) by 2—3,5(—4) cm. *Philippines* . . . 196. *V. halconense*
- 131.a. Corolla broadly cylindric, but slightly contracted below the lobes, or even subcampanulate-cylindric, 7—8 by 5—6 mm . . . 132
- b. Corolla tubular-urceolate, up to 4(—5) mm wide . . . 133
- 132.a. Calyx densely whitish-greyish-pubescent. *New Guinea* 208. *V. brassii* var. *brassii*
- b. Calyx glabrous. *New Guinea* 208. *V. brassii* var. *madarum*
- 133.a. Leaves 2,5—3,5 by (0,7—)0,9—1,4 cm. *New Guinea* 209. *V. leptomorphum*
- b. Leaves 3,5—10 by (1,5—)2—2,5(—3,7) cm . . . 134
- 134.a. Leaves ( $\pm$  oblong-elliptic) shortly acuminate and subacute (or sometimes obtuse) at the apex. *Philippines* . . . 196. *V. halconense*
- b. Leaves longer and subcaudately or caudately acuminate,  $\pm$  acute at the apex . . . 135
- 135.a. Leaves elliptic to oblong-elliptic, widest in the middle. Pedicels stoutish. *New Guinea* 210. *V. capillatum*
- b. Leaves ovate to elliptic, rarely sublanceolate-ovate, widest below the middle. Pedicels (rather) slender . . . 136
- 136.a. Rhachis and pedicel finely patently puberulous. (Calyx tube cup-shaped, base rounded, lobes c. 1,5 mm.) *New Guinea* . . . 211. *V. reticulato-venosum*
- b. Rhachis and pedicels glabrous . . . 137
- 137.a. Calyx tube cylindric, base truncate, lobes quite glabrous, 0,5 mm. *New Guinea* 176. *V. gracile*
- b. Calyx tube cup-shaped, base rounded, lobes penicillate apically, c. 1,3 mm. *New Guinea* 224. *V. turfosum*
- 138.a. Leaves small, up to 2,5 (or may be in part in the same specimen up to 3,5) cm, laxly or mostly  $\pm$  densely arranged . . . 139
- b. Leaves larger, at least for the greater part in the same specimen, mostly rather laxly arranged . . . 146
- 139.a. Corolla 5—6 mm. (Tubules slender, i. e.  $\pm$  half as wide as the thecae.) . . . 140
- b. Corolla at least 7 mm . . . 141
- 140.a. Leaves 2,5—3,5 by 1,2—1,8 cm. *New Guinea* . . . 189. *V. angienise*
- b. Leaves 0,8—1,3 by 0,4—0,7 cm. *Celebes* . . . 212. *V. tomicipes*
- 141.a. Tubules slender, c. half as wide and  $\pm$  as long as the thecae. Leaves minutely crenulate in the upper third. *New Guinea* . . . 213. *V. apiculatum*
- b. Tubules as wide and hardly  $\frac{1}{3}$  (or less) as long as the thecae. Leaves quite entire . . . 142
- 142.a. Corolla  $\pm$  20 mm. *Celebes* . . . 214. *V. sclerophyllum*
- b. Corolla 7—12 mm . . . 143

- 143.a. Corolla broadly urceolate, c. 8 mm in diam. below. *New Guinea* . . . . . 202. *V. stellae-montis*
- b. Corolla more narrowly urceolate, up to 4,5 mm in diam. . . . . 144
- 144.a. (Leaves coriaceous, ovate-elliptic or elliptic, 1,8—3,3 by 0,8—1,6 cm.) Pedicel rather robust, c. 5 mm. *New Guinea* . . . . . 215. *V. ligustrifolium*
- b. (Leaves subcoriaceous to coriaceous.) Pedicel slender to filiform, (4—)5—7 (—10) mm . . . . . 145
- 145.a. Leaves  $\pm$  obovate, sometimes oblong-elliptic, (1—)1,5—2,5 by 0,6—1,2 cm. *Sumatra, Java, Bali, Lombok, W. Flores, Celebes* 116. *V. lucidum* var. *lucidum*
- b. Leaves elliptic or subovate-elliptic, not rarely obovate or subrhombic, 0,7—1,2 by 0,4—0,6 (—0,7) cm. *Sumatra* . . . . . 216. *V. bartlettii*
- 146.a. Corolla (1,6—)2—2,5 (—3) cm . . . . . 147
- b. Corolla up to 1,4 cm . . . . . 148
- 147.a. Leaves ovate to oblong-ovate. *Celebes* . . . . . 217. *V. pilosilobum*
- b. Leaves elliptic to elliptic-obovate. *New Guinea* . . . . . 188. *V. angulatum*
- 148.a. Leaves obovate to obovate-spathulate or elliptic-obovate . . . . . 149
- b. Leaves of other form, certainly not predominantly obovate . . . . . 153
- 149.a. Tubules as long as or mostly shorter and not or not much narrower than the thecae . . . . . 150
- b. Tubules elongate, longer and much narrower than the thecae . . . . . 151
- 150.a. Corolla 6—8 (—10) by 3—4 (—5) mm. Calyx densely glandular-muriculate. *New Guinea* . . . . . 218. *V. acrobracteatum*
- b. Corolla 8 by 8 mm. Calyx glabrous. *New Guinea* . . . . . 203. *V. lageniforme*
- 151.a. Stamens about half as long as the corolla. *Mindoro* . . . . . 219. *V. nitens*
- b. Stamens as long as and finally a little exserted from the corolla . . . . . 152
- 152.a. Anthers not spurred dorsally. *Malay Peninsula* . . . . . 180. *V. viscifolium* var. *viscifolium*
- b. Anthers 2-spurred dorsally. *Malay Peninsula* 180. *V. viscifolium* var. *calcaratum*
- 153.a. Leaves provided at intervals with several impressed marginal glands or faint crenulations up to the top of the lamina . . . . . 154
- b. Leaves provided with 1 or 2 (or at most 3) pairs of marginal glands at or near the base, i. e. certainly within the lower third of the lamina . . . . . 155
- 154.a. Calyx tube and disk glabrous. Leaves (very) shortly petiolate or almost subsessile. *Philippines* . . . . . 220. *V. jagori*
- b. Calyx tube and disk pubescent. Leaves distinctly petiolate. *Philippines* . . . . . 221. *V. sylvaticum*
- 155.a. Leaves  $\pm$  shortly and broadly, in general  $\pm$  obtusely attenuate or acuminate at the apex . . . . . 156
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118. *V. latissimum* J. J. S., Bull. Jard. Bot. Btzg III, 1, 1920, 409, t. 56.

CELEBES. Central part, G. Tolongan, *Rachmat 1000* (BO, type; L). Makale-Rantepao, Uluway, 1500 m, *V. Zijl de Jong 37*; Mamasa, 1150 m, *Mamahit 5*; ibid., Lombonan, 1400 m, *Steup 142*. Latimodjong Mts, Rantelemo, 1500 m, *Kjellberg 1571*. Masamba, 1300 m, *F. R. I. bb. 24164*. Masawa Polewali, *Noerkas (Exp. Van Vuuren) 506*. Rantelemo-Angin, crest of Pokapindjang, 1400 m, *Van Steenis 10316*. Kantewu, *Kaudern 292*. Kanandéde-Komba, 600—1000 m, *Eyma 1146*. Poso, S. Malei, 1400—1600 m, *Eyma 1677*; ibid., Boro-Póena, 1700—1800 m, *Eyma 1639*.

119. *V. contractum* Sleum., Bot. Jahrb. 71, 1940, 160.

CELEBES. Central part, Poanáa Mts (120° 20'—2° 20') 1630 m, *P. B. & K. F. Sarasin, It. Cel. II, S 2080* (B, type, †; L, fragm. ex B).

120. *V. warburgii* Sleum., Bot. Jahrb. 71, 1940, 167.

CELEBES. Central part, between Tjamba and Manipi (119° 55'—5° 10'), c. 3000 m, *Warburg 16811* (B, type, †; L, fragm. ex B). B. Pokapindjang, 2200 m, rare, *Kjellberg 1490* (BO, S).

121. *V. aucupis* Sleum., Bot. Jahrb. 71, 1940, 160.

CELEBES. Southeastern part, Mengkoka Mts, c. 1500 m, *Heinrich 332* (B, type, †; L, fragm. ex B); ibid., Porema, c. 1400 m, *Kjellberg 2726* (BO).



122. *V. minuticalcaratum* J. J. S., Nova Guinea 12 (2), 1914, 160, t. 46; Sleum., Bot. Jahrb. 72, 1942, 254; Kaneh. & Hatus., Bot. Mag. Tokyo 56, 1942, 481.

f. *minuticalcaratum*.

NEW GUINEA. Northwestern part, Arfak Mts, Angi Lakes, 1900—2000 m, *Gjellerup* 1164 (BO, type; K, L); *Kanehira* & *Hatusima* 13530 (cit. K. & H., not seen), 13925; *Kostermans* 2109, 2399.

f. *glabrum* J. J. S., Nova Guinea 12 (5), 1917, 527; Sleum., Bot. Jahrb. 72, 1942, 254. — *V. minuticalcaratum* J. J. S. f. *latifolium* J. J. S., Nova Guinea 12 (5), 1917, 528; Sleum., Bot. Jahrb. 72, 1942, 254.

NEW GUINEA. Southwestern part, Kajan Mts, crest, 3200 m, *Pulle* (leg. *Versteeg*) 2462 (BO, type of *V. minuticalcaratum* f. *glabrum*; K, L). Wichmann Mts, 3000 m, *Pulle* 1014 (BO, type of *V. minuticalcaratum* f. *latifolium*; K, L). Northern part, Habbema Lake, 3225 m camp, *Brass* 9364, 9502. Bele R., 2350 m, *Brass* 11289. Southeastern part, Centr. Distr., crest of Mt Victoria, NW of the 'Gap', 2895 m, *Carr* 15116, fr.

123. *V. quinquefidum* J. J. S., Med. Rijksherb. 25, 1915, 11; Nova Guinea 12 (5), 1917, 529; l. c. 1918, t. 218; Sleum., Bot. Jahrb. 72, 1942, 250. — *V. nycteroides* Wernh., Trans. Linn. Soc. ser. 2 Bot. 9, 1916, 92; Sleum., Bot. Jahrb. 72, 1942, 257 ("*nyctericoides*").

var. *quinquefidum*.

NEW GUINEA. Southwestern part, Wichmann Mts, summit region, 3000 m, *Pulle* 1047 (BO, type of *V. quinquefidum*; L). Ascent from Utakwa R. to Mt Carstensz, 2530—3350 m, *B. Kloss* s.n. (BM, type of *V. nycteroides*).

var. *oranjense* J. J. S., Nova Guinea 12 (5), 1917, 530; Sleum., Bot. Jahrb. 72, 1942, 250.

NEW GUINEA. Southwestern part, Oranje Mts, above 'Meerbivak', 3600 m, *Pulle* (leg. *Versteeg*) 2497 (BO, type; L); 7—11 km NE of Mt Wilhelmina top, 3400—3560 m, *Brass* & *Meijer Drees* 9645, 9994.

124. *V. brachygyne* J. J. S., Med. Rijksherb. 25, 1915, 11; Nova Guinea 12 (5), 1917, 528; l. c. 1918, t. 217; Sleum., Bot. Jahrb. 72, 1942, 249. — *V. obovalifolium* Sleum., l. c.

NEW GUINEA. Northern part, Oranje Mts, 9 km NE of Lake Habbema, 2800 m, *Brass* 10639 (A, BO, BM; L, type of *V. obovalifolium*); Lake Habbema, 3225 m camp, *Brass* 9366, 9558. Southwestern part, Wichmann Mts, summit region, 3000 m, *Pulle* 1001, 1046 (BO, lectotype of *V. brachygyne*; K, L).

125. *V. paradisearum* Becc., Malesia 1, 1878, 209; Sleum., Bot. Jahrb. 72, 1942, 255. — *V. profusum* J. J. S., Nova Guinea 12 (2), 1914, 164, t. 50; Kaneh. & Hatus., Bot. Mag. Tokyo 56, 1942, 482. — *V. psittacobium* Sleum., Bot. Jahrb. 72, 1942, 255.

NEW GUINEA. Northwestern part, Arfak Mts, Hatam, c. 2000 m, *Beccari* (*Herb. Beccari* 5712, incl. 5712 A) (FI, type of *V. paradisearum*); Angi Lakes, 1900 m, *Gjellerup* 1073, 1150 (BO, lectotype of *V. profusum*; K, L); ibid., 3000 m, *Pratt* s.n. (K); ibid., Angi gigi, 2100 m, *B.W.* 2035 *Stefels*, fl. red; *B.W.* 2036 *Stefels*, fl. white; *Kostermans* 2348; Mt Koebré, 2200—2300 m, *Kanehira* & *Hatusima* 13697, 14050. Western part, Wissel Lake region, lookout Perai, 2400 m, *Eyma* 5273. Weyland Mts, 2100 m, *Stein* 415 (B, type of *V. psittacobium*, †). Central part, Star Mts, Mt Antares, 3000—3300 m, *Kalkman* 4486, 4541, fl. rose or pink.

126. *V. megalophyes* Sleum., Bot. Jahrb. 72, 1942, 253.

NEW GUINEA. Northern part, 15 km SW of Bernhard camp, Idenburg R., 1800 m, *Brass* 12170 (A, BM, BO; L, type; LAE), fl. galled; 12104, fl. well developed (A, BO, L). Balim R., 2160 m, *Brass* & *Versteegh* 11189, fr. 9 km NE of Habbema Lake, 2720—2800 m, *Brass* 10860, fr.; *Brass* & *Versteegh* 10477, fr.

127. *V. stenolobum* Schltr, Bot. Jahrb. 55, 1918, 177, f. 10; Sleum., l. c. 72, 1942, 257.

NEW GUINEA. Northern part, Sepik Distr., West Range, 'Lager Felsspitze' (141° 30'—4° 10'), 1400—1500 m, *Ledermann* 12767 (B, †), 12894 (B, †), 12949 (B, type, †).

128. *V. otophyllum* Sleum., Bot. Jahrb. 72, 1942, 263.

NEW GUINEA. Northern part, 9 km NE of Lake Habbema, 2860 m, *Brass* 11005 (A, BO; L, type).

129. *V. cordifolium* Stapf, Trans. Linn. Soc. ser. 2 Bot. 4, 1894, 189, t. 15, f. D 7—11; Gibbs, J. Linn. Soc. Bot. 42, 1914, 101; Merr., En. Born. 1921, 466.

BORNEO. North Borneo, Mt Kinabalu, (1525—)2400—2900 m, *Haviland* 1133, 1134, 1148 (K, lectotype); *Gibbs* 4164, 4224; *Carr* SF 27492; *Clemens* 10534, 10698, 27091, 28926, 29088, 30941, 31750, 33151, 40685, 40685 A, 50428; *Sinclair* 9096; *Jacobs* 5736; *Smythies* 10616; *Collenette* 557.

130. *V. cercidifolium* J. J. S., Bull. Jard. Bot. Btzig III, 13, 1935, 463.

BORNEO. Sarawak, Mt Dulit, 1300 m, *Richards* 1898, 2124. Central part, Bt. Batu Tiban, 1700 m, *Mjöberg* 5 (BO), 59 (BO, lectotype; L).

131. *V. appendiculatum* Schltr, Bot. Jahrb. 55, 1918, 180, f. 12; Sleum., l. c. 72, 1942, 263.

NEW GUINEA. Northern part, Sepik Distr., West Range, 'Lager Felsspitze' (141° 30'—4° 10'), 1400—1500 m, *Ledermann* 12778 (B, type, †).

132. *V. korthalsii* Miq., Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 40 (based on *Arbutus coriacea* Bl.); Steen., Bull. Jard. Bot. Btzig III, 17, 1948, 388; Amsh. in Back., Bekn. Fl. Java (em. ed.) 7 B, 1948, fam. 163, p. 4. — *Arbutus coriacea* Bl., Cat. 1823, 67, cf. Flora 8 (1), 1825, 140. — *Thibaudia coriacea* (Bl.) Bl., Bijdr. 1826, 860; Hassk., Cat. Hort. Bot. Bog. 1844, 161. — *Agapetes coriacea* (Bl.) G. Don, Gen. Syst. 3, 1834, 863; Dun. in DC., Prodr. 7, 1839, 555; Mor., Syst. Verz. Zoll. 1846, 42; Hassk., Pl. Jav. Rar. 1848, 471, sub *Agapetes floribunda*. — *Epigynium coriaceum* (Bl.) Kl., Linnaea 24, 1852, 52. — *Vaccinium coriaceum* (Bl.) Miq., Fl. Ind. Bat. 2, 1859, 1062; Bl. & Fisch., Fl. Javae Pl. inéd. 1863/83, t. 23; Koord., Exk. Fl. Java 3, 1912, 19; Koord.-Schum., Syst. Verz. 1, 1912, fam. 233, p. 108; Koord., Fl. Tjib. 1918, fam. 233, p. 10; J. J. S. in K. & V., Bijdr. 13, 1914, 142; Sp. Moore, J. Bot. 63, 1925, Suppl. 57, nec Hook. f. (1852).

SUMATRA. Atjeh, confluence of R. Kapi and R. Aunan, 1100—1200 m, *Van Steenis* 9979. G. Kemiri, 1200—1300 m, *Van Steenis* 9755. Pangulubahu, 2000 m, *Batten Pool* s.n. Westcoast, G. Kerintji, Sg. Kering, *Alston* 14107; *ibid.*, Kaju Aro, 1400—1500 m, *Jacobs* 4551. G. Singgalan, *Beccari* P. S. 234.

JAVA. Bantam, Pasir Orai, 600—820 m, *Forbes* 272a, 588b. G. Karang, 1000 m, *Koorders* 40090. Preanger/Djakarta, G. Gedeh-G. Pangrango, *Zollinger* 1948. Tjibodas, 1300—1500 m, *Scheffer* s.n.; *Franck* 595; *Boerlage* s.n.; *Koorders* 31533, 31709, 37106; *Sapei* 446; *Van Ooststroom* 13822; *Soegeng* Reksodihardjo 119. Tjibureum,

J. J. Smith 426; Arsin 19571. G. Gegerbintang, *Sapiin s.n.* Kertamanah, 1550 m, J. J. Smith *s.n.* (cit. Smith, not seen). G. Lamongan, Zollinger 631 (cit. Zoll., not seen). G. Salak, Batu Tulien, Reinwardt Oct. 1822 (L, type of *Arbutus coriacea*); *ibid.*, Tjiapus kloof, 650 m, Van Steenis 5112. Pangheotan, c. 1100 m, Van der Pijl 791. Nirmala, 1500 m, Backer 10637. Gadok, 900 m, Lam 58. J. Pateung-Kamodjan, Garut, 1400 m, Docters van Leeuwen 13256. G. Tjissalak, Nongnong *s.n.* Locality not given, Korthals *s.n.*; Junghuhn 92; Kollmann *s.n.*; Lobb *s.n.*; Zipelius *s.n.*

BALL. G. Batukau, 1200 m, de Voogd 1975.

133. **V. tentaculatum** J. J. S. in Fedde Rep. 30, 1932, 175.

CERAM. Central part, Northeast Mts, G. Tuwala, 1100 m, Stresemann 362 (L, type).

134. **V. muriculatum** J. J. S., Nova Guinea 12 (2), 1914, 161, incl. var. *albidum* J. J. S., l. c. 162; Sleum., Bot. Jahrb. 72, 1942, 259.

NEW GUINEA. Northwestern part, Arfak Mts, Angi Lakes, 1800—1900 m, Gjellerup 1086 (BO, type of *V. muriculatum*; K, L), 1165 (BO, type of *V. muriculatum* var. *albidum*; L); *ibid.*, Angi Gita, 1800 m, Kostermans 2263.

135. **V. elegans** Elm., Leaf. Philip. Bot. 3, 1911, 1093; Merr., En. Philip. 3, 1923, 249; Copel. f., Philip. J. Sc. 42, 1930, 569, pl. 4, f. 1—2.

PHILIPPINES. Mindanao, Todaya (Mt Apo), c. 1980 m, Elmer 11683 (A, BM, FI, G, GH, K, L, NY, P; PNH, type, †); Mt Katanglad, 2370 m, PNH 10139 Sulit.

136. **V. goodenoughii** Sleum., nov. spec. — *Alte scandens*. Rami subpendentes. Ramuli graciles, in partibus recentissimis obtusangulis papilloso-puberuli, ceterum glabri citoque corticati, laxe foliati. Folia lanceolata vel oblongo-elliptica, apice 1—1,5 cm longe subcaudato-acuminata, apice extremo obtusiuscula, basi  $\pm$  late in petiolum attenuata, ad ipsam basin utroque latere glandula incrassata sat parva instructa, subcoriacea, firmula, glabra, subtus sublucida, integra, plana vel ad ipsam marginem minute revoluta, (4—) 4,5—6,5 cm longa, (1,5—) 2—3 cm lata, costa supra anguste immersa, subtus prominente, nervis utroque latere 2 basalibus vel paullo suprabasalibus alte curvato-ascendentibus, ceteris similibus 1—2 altius a costa abeuntibus, omnibus anastomosantibus utrinque aequaliter prominulis, reticulatione densa supra minute, subtus saepe distinctius elevata; petioli sat graciles, applanati, supra sulcati, 3—4 mm longi. c. 1 mm crassi, initio puberuli. Racemi ex axillis summis 2 vel 3(—5) orti, suberecti vel patuli, sat laxe 8—15-flori, eperulati; rhachis angulata, gracilis, omnino glabra, 2,5—4(—5) cm longa. Pedicelli subgraciles, glabri, 4—6 mm longi, basi hic inde bractea membranacea oblonga (normaliter citissime caduca), 6—8 mm longa, 2—3 mm lata fulti, bracteolis haud visis. Calycis tubus late campanulatus, basi rotundatus, glaber, nitidus, 1 mm altus, limbus valde humilis, undulatus vel vix lobatus, ciliatus, loborum loco glandulis 5 sat crassis ornatus. Corolla tubuloso-urceolata, apicem versus sensim angustata, alba, membranacea, utrinque glabra, 5—6 mm longa, inferne c. 3, superne 2 mm diam., lobis reflexis vix 1 mm longis. Stamina 10, c. 3 mm longa; filamenta subulata, pilosa, c. 2 mm longa; thecae late subovato-oblongae, 0,8 mm longae; tubuli cylindrici, tubo ipso 0,2—0,3 mm longi, pilis glanduliferis brevibus paucis vel hic inde glandula sessilibus instructi, apice oblique abscissi, pariete postico in dentem 0,3—0,4 mm longum erectum extenuato. Discus crassus glaber. Stylus columnaris glaber, 4—5 mm longus. Bacca haud cognita.



NEW GUINEA. Southeastern part, Milne Bay Distr., Goodenough Isl., E slopes, 1600 m, fl. Oct. 1953, *Brass* 24832 (A; L, type), high climbing liana in ridge forest.

137. *V. hellwigianum* Sleum., Bot. Jahrb. 72, 1942, 260. — *V. acutissimum* (non F. v. M.) Warb., l. c. 16, 1892, 15; K. Schum. & Laut., Fl. Schutzgeb. 1900, 488; Schltr., Bot. Jahrb. 55, 1918, 182.

NEW GUINEA. Northern part, Madang Distr., Finisterre Mts, 2300 m, *Hellwig* 320 (B, †). Morobe Distr., Ogeramnang, 2000 m, *Clemens* 4751 (B, †), 5479 (A; B, holotype †, isotype preserved); Sambanga, 2000 m, *Clemens* 6971 (B, †), 7470a (B); Samanzing, 1800—2000 m, *Clemens* 8842 bis (B, †), 9069 (A, B); Yunzaing, 1500 m, *Mayr* 764 (B, †); *Clemens* 3589 (G); ibid., Mt Alok, 1400—1600 m, *Clemens* 2375 (A).

138. *V. psammogenes* Sleum., Bot. Jahrb. 72, 1942, 260.

NEW GUINEA. Southern part, Western Distr., Oroville camp, Fly R., 30 miles above d'Albertis junction, *Brass* 7404 (A, BM, BO, K; L, type; LAE). Northeastern part, Morobe Distr., Sattelberg region, Wareo, 610 m, *Clemens* 1404 (A, B, G, L); above Sattelberg mission, 915—1035 m, *Clemens* 351 (A, B, G, L), 658 (A, G, L); ibid., between Balung R. and Kaile, 1220 m, *Clemens* 4965 (A, B).

139. *V. longiporum* Schltr., Bot. Jahrb. 55, 1918, 178, f. 11; Sleum., l. c. 72, 1942, 259.

NEW GUINEA. Northeastern part, Madang Distr., Finisterre Mts, 1100 m, *Schlechter* 18025 (B, type, †; P).

140. *V. acutissimum* F. v. M., Trans. R. Soc. Vict. 1 (2), 1889, 15; Wright, Kew Bull. 1889, 102; Sleum., Bot. Jahrb. 72, 1942, 259.

var. *acutissimum*.

NEW GUINEA. Southeastern part, Centr. Distr., Mt Musgrave, c. 2800 m, *McGregor* anno 1889 (K, type; MEL). Mt Scratchley, 3050—3960 m, *Giulianetti* anno 1896 (K, MEL). Mt Albert Edward, 3680 m, *Brass* 4324. Locality not given, *Giulianetti* & *English* anno 1897 (K).

var. *pilosistylum* Sleum., nov. var. — Disco piloso styloque inferne fere usque ad medium laxe piloso differt. Habitu *V. cruento* simillimum, sed tubulis glandulis stipitatis adpersis discoque styloque piloso distinctum.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Otto, 2540 m, *Brass* & *Collins* 31014 (L, type), fl. 12-8-1959.

141. *V. carneolum* Sleum., Bot. Jahrb. 72, 1942, 262.

var. *carneolum*.

NEW GUINEA. Eastern part, Morobe Distr., Sattelberg region, Ogeramnang, 915 m, *Clemens* 4607 (B, †), 5410a (A; B, type, †), 5419a (A, B); Yunzaing, 1500 m, *Clemens* 3254 (B, †), 3461 (B, †), 3591 (B, †), 3970 (A, G), 4153 (A, G); *Mayr* 765 (B, †). Bulung R. vicinity, 1000—1600 m, *Clemens* 5196 bis (A, B). Wau-Salamaua road, near summit camp, 1920 m, *N. G. F.* 8718, 8734 *Womersley* & *Millar*; ibid., near Skindeway, 1645 m, *N. G. F.* 8379, 8437 *Womersley* & *Millar*. Southeastern part, Centr. Distr., Alola, 1830—1890 m, *Carr* 13658, 14087; Isuarava, 1465 m, *Carr* 15427. Ascent to Mt Victoria, NW of the 'Gap', 2895 m, *Carr* 15131 (form with smaller leaves). Murray Pass, Wharton Range, 2840 m, *Brass* 4658. Ueli, Kunimaipa valley, 1220 m, *Brown* 170 (A). Milne Bay Distr., Mt Dayman (Maneau Range), 2750 m, *Brass* 22270 (fr., det. not certain).

var. *nesophilum* Sleum., nov. var. — A typo foliis paullo minoribus, 4—6,5 cm longis, 1,5—2,5 cm latis, sub-5-plinerviis, nervis magis patentibus,

corolla subventricosio-urceolata apicem versus parum et gradatim angustata et c. 3 mm diam. diversum. — An species propria?

NEW GUINEA. Southeastern part, Louisiade Arch., Misima Isl., Mt Sisa, N slopes, 350 m, *Brass* 27566, fl. pink 27-7-1956, large shrub, epiphytic high on a canopy tree in rain forest (A, BO, K; L, type).

142. **V. albicans** Sleum., Bot. Jahrb. 72, 1942, 261.

var. **albicans**.

NEW GUINEA. Eastern part, Morobe Distr., Sattelberg region, Sambanga, 1525—1830 m, *Clemens* 7731a (B, †), 7761 (A; B, holotype †, isotype preserved); *ibid.*, Samanzing, 1500—1650 m, *Clemens* 8907 (B, †), 8955 (B), 9254 A (B); Kesengan sugu, 1220 m, *Clemens* 41271 (A); Wantoat, 1065—1830 m, *Clemens* 11000 (A). Partep, N. G. F. 3004. Eastern Highlands, Kainantu-Kassam road, c. 1525 m, *Pullen* 699; track Arau-Obura, 1500 m, *Brass* 32132; Goroka subdistr., Dunantina valley, c. 1585 m, *Pullen* 651. Chimbu subdistr., Kerowagi, c. 1980 m, *Robbins* 627. Western Highlands, Minj subdistr., Kujip, 1370 m, *Robbins* 547. Nondugl, 1600 m, *N. G. F.* 4354 *Womersley*; *Gyldenstolpe s.n.* (S). Centr. Distr., Vanapa valley, 1500 m, *Brass* 4806; Mafulu, 1250 m, *Brass* 5404; Sogere, c. 1650 m, *Forbes* 292 (BM).

var. **pseudopsammogenes** Sleum., nov. var. — Pedicelli calycesque glabri. Corolla 6—7 mm longa, saepius intus in inferiore media parte laxe pilosa. Stamina 3—3,5 mm tantum longa. Filamenta 2 mm longa. Folia ad totam marginem punctis glandulosis remotis paucis subimpressis vel planis instructa, cetera ut in var. typ.

NEW GUINEA. Southeastern part, Morobe Distr., Partep Creek, Wau road, 760 m, fl. white, 8-11-1955, *N. G. F.* 7817 *Womersley* (A, CANB, K; L, type; LAE, SING). Edie Creek road, near Wau, 1220 m, *N. G. F.* 4436 *Womersley*. Bulolo, *N. G. F.* 3962 *Fryar*. Wuri-wuri, upper Bulolo valley, *N. G. F. s.n.* *Henty* (LAE). Centr. Distr., Tapini, 1615 m, *N. G. F.* 10706 *White*.

var. **pubens** Sleum., nov. var. — Calyx et pedicelli laxe subpatenter brevipilosi. Corolla 6—7 mm longa, per totam faciem interiorem laxe pilosa. Stamina 3 mm longa. Filamenta 2 mm longa. Tubuli brevissimi. Folia per totam marginem glandulis paucis remotis distincte impressis instructa; cetera ut in var. typ.

NEW GUINEA. Southeastern part, Morobe Distr., Bulolo-Watut Divide, c. 1400 m, fl. creamy white 26-7-1955, *N. G. F.* 7553 *Havel* (A, BO, CANB, K; L, type; LAE). Wau, 1065 m, *N. G. F.* 7209 *Floyd*. Wau-Edie Creek road, 1500 m, *Brass* 29139; *ibid.*, Lookout point, 1525 m, *N. G. F.* 11032 *Womersley & Brass*.

143. **V. daphniphyllum** Schltr, Bot. Jahrb. 55, 1918, 181; Sleum., l. c. 72, 1942, 264. — *V. piroliflorum* J. J. S., Nova Guinea 18, 1936, 115, t. 30, f. 1.

NEW GUINEA. Northern part, Rouffaer R., 175 m, *Docters van Leeuwen* 9811 (A; BO, lectotype of *V. piroliflorum*; BRI, K, L, SING); *ibid.*, 250 m, *Docters van Leeuwen* 10297, 10425. Sepik Distr., Hunstein Range, c. 1300 m, *Ledermann* 11303 (B, type of *V. daphniphyllum*, †); 'Etappenberg', April R., c. 850 m, *Ledermann* 8935 (B, †).

144. **V. convallariiflorum** J. J. S., Nova Guinea 18, 1936, 116, t. 30, f. 2; Sleum., Bot. Jahrb. 72, 1942, 264.

NEW GUINEA. Northern part, Doormantop, 1800 m, *Lam* 1919 (BO, type; L). 18 km SW of Bernhard Camp, Idenburg R., 2150 m, *Brass* 12458.

145. **V. viridiflorum** J. J. S., Nova Guinea 18, 1936, 117, t. 31, f. 1; Sleum., Bot. Jahrb. 72, 1942, 253.

NEW GUINEA. Northern part, Rouffaer R., confluent C, 250 m, *Docters van Leeuwen* 10298 (A, BM; BO, type; BRI, K, L, NY, P, SING).

146. *V. simulans* Sleum., Bot. Jahrb. 71, 1940, 165.

var. *simulans*.

BORNEO. North Borneo, Mt Kinabalu, 1220—1830(—2750 ?) m, *Clemens* 28919, 29025, 29387 (A; B, type, †; BO, K, L, NY, SING), 29388, 29388 A, 29625, 29857, 31529, 31935, 32440, 32458, 32542, 32619, 33045, 33046, 40576, 50414; *KEP* 80375 *Wyatt-Smith*.

Similar in habit, but longer and more slender pedicels, flowers not known:

BORNEO. Southeastern part, G. Beratus (Peak of Balikpapan), 900—1000 m, *Kostermans* 7335, 7605, in mossy forest on sandstone.

var. *leptopodium* Sleum., nov. var. — Pedicellis gracilioribus fere filiformibus, sub anthesi (3—)4—6 mm longis, calyce minore, calycis limbo undulato brevius 5-loba, corolla 5 mm tantum longa diversum.

BORNEO. North Borneo, Mt Kinabalu, Tenompok, 1525 m, *Clemens* 29785, 29787 (A, BM, BO, G, K; L, type; NY); *ibid.*, 1065—1585 m, *SF* 26700 *Carr*; near Bundu Tahan, 1220 m, *SF* 27226 *Carr*.

147. *V. mjoeborgii* J. J. S., Bull. Jard. Bot. Btzig III, 13, 1935, 461.

BORNEO. Central part, Bt. Batu Tiban, 1700 m, *Mjöberg* 54 (BO, type; L). Central Eastern part, W. Kutei, summit of Mt Kemul, 1850 m, *Endert* 4395.

148. *V. pachydermum* Stapf, Trans. Linn. Soc. ser. 2 Bot. 4, 1894, 189; *Merr.*, En. Born. 1921, 467; *Sarawak Mus. J.* 3, 1928, 543.

BORNEO. Sarawak, Mt Kalulong, c. 1525 m, *Pickles SAR* 3745; Mt Murud, 1900—2400 m, *Mjöberg* 108; Mt Dulit, 1300 m, *Synge* 1990. Locality not given, *Nat. coll.* 102. North Borneo, Mt Kinabalu, 1200—1525(—3350) m, *Haviland* 1140 (K, lectotype; SAR, SING), 1264; *Clemens* 10690, 10928, 27802, 29958, 30594, 30864, 30931, 32233, 32333, 32391, 32482, 32545, 32814, 35073, 40676, 40688, 50618, 51005; *Smythies* 10641; *Sinclair* 9114, 9131; *Carr SF* 26438, 28037.

149. *V. elliptifolium* Merr., J. Str. Br. R. As. Soc. 76, 1917, 104; En. Born. 1921, 467.

BORNEO. North Borneo, Mt Kinabalu, 1220—1830 m, *Clemens* 10894 (PNH?, lectotype, fl., prob. †, not seen), 11099 (PNH?, fr., prob. †, not seen), 31063, 31404, 40194.

150. *V. endertii* J. J. S., Bull. Jard. Bot. Btzig III, 13, 1935, 462.

BORNEO. Central part, Amai Ambit, *Hallier* 3381. Central Eastern part, W. Kutei, Mt Kemul, 1500 m, *Endert* 3886 (A, BM; BO, type; L, P, SING).

151. *V. camiguinense* Merr., Philip. J. Sc. 7, 1912, Bot. 321; En. Philip. 3, 1923, 248; *Copel. f.*, Philip. J. Sc. 42, 1930, 578.

PHILIPPINES. Mindanao, Camiguin de Misamis Isl., near summit of Mt Mahinog, c. 1000 m, *B. S.* 14622 *Ramos* (PNH, type, †); *B. S.* 14680 *Ramos* (paratype; BM, BO, K, L, P).

152. *V. clementis* Merr., J. Str. Br. R. As. Soc. 76, 1917, 102; En. Born. 1921, 466.

BORNEO. Sarawak, Mt Santubong, *Nat. coll.* 2235 (PNH?, type, prob. †, not seen; K); Mt Poi, 1300 m, *Foxworthy* 204; G. Tiang Laju, *Beccari P. B.* 2388, 3232; Bt. Mayeng, Tau Range, 670 m, *Purseglove* 5368. Bintulu, Merurong plateau, 730 m, *Brunig S* 8880; *ibid.*, Batu Eklap, 1035 m, *Brunig s.n.* Brunei, Mt Bugoh, Lawas Distr., 610 m, *BRUN* 817 *Smythies*; Bt. Tanggoi, 820 m, *BRUN* 757 *Ashton*. Bt. Sagan,



550 m, *Hasan BRUN 3115*. G. Pagon, 1430—1550 m, *Ashton BRUN 1378, 2139*, gregarious in elfin woodland. North Borneo, Mt Kinabalu, 1065—1830 m, *Clemens s.n.* (cit. Merr., prob. PNH, †); *Clemens 29103, 30929, 31429, 32470, 32472, 32988, 34310, 40681, 40867, 50040, 50401, 50529*; *Carr SF 26416, 26700*. Summit of Mt Silam, 12 miles WSW of Lahad Datu, 885 m, *SAN A 4189 Wood*. Central Borneo, G. Kelam, *Hallier 2476*. Amai Ambit, *Hallier 3411*. Bt. Mili, *Amdjah 83*. Batu Ajoh, *Jaheri 1661*. East Borneo, W. Kutei, Mt Palimasan, near Tabang, Belajan R., 700 m, *Kostermans 12916*.

Similar in habit, but leaves more dense and branchlets velutinous:

BORNEO. Sarawak, Mt Murud, 1900—2400 m, *Mjöberg 109* (A), sterile, cf. Merr., Sarawak Mus. J. 3, 1928, 543, as *Vaccinium sp.*

153. **V. palawanense** Merr., Philip. J. Sc. 3, 1908, Bot. 373; Elm., Leaf. Philip. Bot. 3, 1911, 1099; Merr., En. Philip. 3, 1923, 251, p. p.; Copel. f., Philip. J. Sc. 42, 1930, 581, pl. 5, f. 8—9.

var. **palawanense**.

PHILIPPINES. Palawan, Mt Victoria, c. 1000 m, *B. S. 696 Foxworthy* (BM, BO, K, L, NY; PNH, type, †; SING; US, cit. Copel. f., not seen). Mindanao, Davao prov., Mt Apo, *Elmer 11252, 11390, 11470*.

var. **foxworthii** (Copel. f.) Sleum., nov. stat. — *V. foxworthii* Copel. f., Philip. J. Sc. 42, 1930, 580, p. p.

PHILIPPINES. Palawan, Mt Victoria, 1750 m, *B. S. 649 Foxworthy* (BM, BO, GH, NY; PNH, type of *V. foxworthii*, †; US, cit. Copel. f., not seen).

154. **V. cornigerum** Sleum., Bot. Jahrb. 72, 1942, 259.

NEW GUINEA. Southeastern part, Centr. Distr., Lala R., Owen Stanley Range, 1675 m, *Carr 14080* (A; B, type, †; BM, K, L, SING); Alola, 1890 m, *Carr 13643*. Mt Obree, 2285—2470 m, *Sayer anno 1887* (MEL, slightly different by muriculate glands on pedicels and calyces, and deep red flowers). Milne Bay Distr., Mt Gaugun, Daga country, 1585—1615 m, *Cruttwell 657, 1105*; Mt Simpson, 1525 m, *Cruttwell 68* (a form with smaller leaves).

155. **V. besagiense** J. J. S., Med. Rijksherb. 30, 1916, 4, f. 2; Sp. Moore, J. Bot. 63, 1925, Suppl. 55.

SUMATRA. Benkulen, G. Pesagi, 2135 m, *Forbes 2051* (BM; L, type).

156. **V. coriaceum** Hook. f. in Hook., Ic. Pl. 1852, t. 892; Walp., Ann. 5, 1858, 440; Stapf, Trans. Linn. Soc. ser. 2 Bot. 4, 1894, 189; Gibbs, J. Linn. Soc. Bot. 42, 1914, 101; Merr., En. Born. 1921, 466.

BORNEO. North Borneo, Mt Kinabalu, (2135—)2440—3350 m, *Low s.n.* (K, type); *Haviland 1132*; *Gibbs 4247*; *Clemens 10697, 27852, 27852 A, 50615, 50783, 50828*; *Carr SF 27603*; *Sinclair c.s. 9099, 9109*.

157. **V. stapfianum** Sleum., Bot. Jahrb. 71, 1940, 168. — *V. buxifolium* Hook. f. in Hook., Ic. Pl., 1852, t. 891; Walp., Ann. 5, 1858, 440; Stapf, Trans. Linn. Soc. ser. 2 Bot. 4, 1894, 189; Gibbs, J. Linn. Soc. Bot. 42, 1914, 101; Merr., En. Born. 1921, 466, non Gilib., Fl. Lithuan. 1, 1781, 4, cf. McVaught, Gent. Herb. 8, 1949, 83—90, non Salisb., Parad. Lond. 1, 1805, t. 4, nom. ill.

var. **stapfianum**.

BORNEO. North Borneo, Mt Kinabalu, (1830—)2440—3500 m, *Low s.n.* (K, type); *Haviland 1083, 1084*; *Gibbs 4172*; *Clemens 10626, 10665, 27116, 28906, 29957, 50617, 50798*.

var. **minus** Sleum., nov. var. — *Saepius epiphyticum*, rarius terrestre. Folia quam in typo laxius disposita, magis obovata. Flores subsessiles, minores. Corolla 2,5—3 mm tantum longa. Stamina breviora (tubuli 1 mm longi; thecae subellipticae, c. 0,5 mm longae; filamenta c. 1,3 mm longa).

BORNEO. North Borneo, Mt Kinabalu, Kinataki R., 2135 m, *Clemens* 31772 32915 (A, BO; L, type; NY), 32932; Panatara R., 2285 m, *Clemens* 32508; Marai Parai, 1525 m, *Clemens* 33143; head of Colombon R., 2440—2745 m, *Clemens* 33913; no special locality given, *KEP* 80368 *Wyatt-Smith*.

158. **V. horizontale** Sleum., nov. spec. — Frutex terrestris vel epiphyticus. Ramuli acute angulati, in partibus recentissimis angulis leviter in alas extenuatis, glaberrimi, denique in partibus vetustioribus griseo-corticati et subteretes, subdense foliati. Folia obovata vel elliptico-obovata, apice breviter obtuse attenuata vel subacuminata, nunquam rotundata, basi in petiolum cuneata, glandulis basalibus utroque latere 2 paullo impressis a petiolo et inter sese 1—2 mm distantibus, coriacea, in sicco dilute viridia, coriacea, lucida, glabra, subtus haud punctata, integra, margine imprimis laminae basin versus  $\pm$  revoluta, 2,5—3,5 cm longa, ((1—)1,2—1,6 cm lata, costa supra impressa, subtus prominente, nervis lateralibus utroque latere 2 basalibus et paullo suprabasalibus alte curvato-ascendentibus, aliis 3—4 pinnatim a costa abeuntibus brevioribus, omnibus anastomosantibus, supra subobscuris, subtus prominulis, reticulatione sat laxa subtus tantum visibili; petioli applanati, supra sulcati, 2—3 mm longi, c. 1 mm crassi. Racemi ex axillis summis 1 vel 2 orti, laxe 5—8(—12)-flori; rhachis sat gracilis, angulata, glabra, 3—4,5 cm longa, perulis haud visis. Pedicelli subgraciles, glabri, 8—10(—12) mm longi, bracteis bracteolisque nullis. Calyx glaber, tubo obconico, ruguloso, 1,5 mm longo, limbo patenti ad  $\frac{3}{4}$  long. 5-lobo, lobis deltoideis subacutis dorso glabris, dense ciliatis, glandula apicali carentibus, c. 1,5 mm longis. Corolla late cylindrico-urceolata, tenera, dilute rosea, extus basi sparsissime pilosula excepta glabra, intus ad dimidiam inferiorem partem subdense albopilosa, ceterum glabra, 9—10 mm longa, 3—4(—5) mm diam., in medio latissima, lobis obtusis reflexis c. 1,5 mm longis. Stamina 10; filamenta filiformia, in parte basali dense, apicem versus laxius albolanata, 4 mm longa; theca oblongae, 1—1,2 mm longae, echinulatae, ecalcaratae; tubuli cylindrici, thecis multo angustiores, apice dilatati et fere transversaliter abscissi, 1 mm, pilis nonnullis glanduliferis patentibus induti. Discus prominens, glaber. Stylus cylindricus, apice extremo glabro excepto subdense  $\pm$  patenter albopilosus, c. 9 mm longus. Bacca ignota.

NEW GUINEA. Southeastern part, Morobe Distr., Edie Creek, 1675 m, fl. 29-12-1954, N. G. F. 6952 *Womersley & Simmonds* (A, BM, CANB, K; L, type; LAE, SING). Centr. Distr., Mt Tafa, 2300 m, *Brass* 4032 (L).

159. **V. bancanum** Miq., Fl. Ind. Bat. Suppl. 1, 1860, 251 (nom. nud.), 587 (descr.); Scheff., Nat. Tijd. N. I. 31, 1870, 363; Gibbs, J. Linn. Soc. Bot. 42, 1914, 101; Merr., En. Born. 1921, 465, nec Kanjilal etc., Fl. Assam 3, 1939, 145 (which apparently is *V. sprengelii* (Don) Sleum.). — *V. suluense* Copel. f., Philip. J. Sc. 42, 1930, 568. — *V. adenurum* C. E. C. Fischer, Kew Bull. 1932, 293.

var. **bancanum**.

SUMATRA. Westcoast, Haran Canyon near Pajakumbuh, on sandstone rocks, 500 m, *Meijer* 4778, 5389. Taram, Bt. Pantai, W of Pajakumbuh, 500 m, *Meijer* 7166

(with more acuminate leaves up to 10 by 4 cm); *ibid.*, R. Tjampo, 500—1000 m, *Meijer* 6982, 6984.

BANKA. Prope Plangas, *Teysmann* 1189 (BO, BRI, MEL; U, type of *V. bancanum*). Serdang, *De Leeuw* 7. Sg. Selan, *Teysmann* s.n. Djebus, *Teysmann* HB 7602. Mt Boei, Sg. Liat, *Teysmann* s.n. G. Maras, 700 m, *De Leeuw* 11; *Kostermans & Anta* 1252.

BILLITON. P. Pandon, *Teysmann* HB 11094. Manggar, *Burger* 11. Locality not given, *Riedel* anno 1876; *Vorderman* s.n.

LINGGA ARCH. P. Singkep, 10 m, *Bünnemeijer* 7094.

ANAMBA ISL. *Henderson* SF 20342.

BORNEO. Sarawak, Kuching, *Haviland* 92, 235, 2162; *ibid.*, Bako National Park, *Purseglove* 5056, 5081, 5617; *For. Dep. Sarawak* 7674, 7708, 10258, 10459, 10460, 12075. Tanjong Po, *Brooke* 10587. Berumput, 1555 m, *Brooke* 8577, 8581. Bukit Berayang, Limbang, 150 m, *Brunig* s.n.. Sampadi hill, *Nat. Coll.* 5226. 'On the sea shore of Sarawak', *Lobb* s.n. (K). No locality given, *Nat. Coll.* 2355 (probably from Kuching). Brunei, Bt. Sagan, 550 m, *BRUN* 5429 *Hasan*. North Borneo, Balambangan Isl., *Wood* 1731 (A, BM, BO, NY; UC, type of *V. suluense*, not seen). Jesselton Distr., mile 4, Keningau, c. 915 m, *N. Borneo For. Dep.* A 3618 *Tuting*. Bt. Sipitang, 610 m, *SAN* 15180 *Wood*. Leila For. Res., 100—245 m, *SAN* 17352 *Nicholson*; *SAN* 19201 *Meijer*. Bt. Patoi, 280 m, *SAN* 17144 *Smythies*, *Wood & Ashton*. Jambongan Isl., *Cabilin* 3709. Sandakan, *Creagh* s.n. (BM, K); *For. Dep. Br. N. Borneo* 1219 *Pascual* (K, type of *V. adenurum*); *Panching* 1018; *ibid.*, Sim-Sim, *Meijer* 7701, 7702. Tambunan, 300—600 m, *Gibbs* 2998; *For. Dep. Br. N. Borneo* 3860, 3875; *For. Dep. F.M.S.* 36487, 36652 *Puasa Angian*. Central part, Liang Gagang, *Hallier* 2892; Ulu Kenepai, *Hallier* 1468. Western part, Singkawang, *Dunselman* 69; *Polak* 253a. Central Eastern Borneo, W. Kutei, Muara Muntai, 15 m, *Endert* 2017; *ibid.*, Long Hut, 120 m, *Endert* 2530; Tandjung plateau, Padang Luwai, *Kostermans* 12532. Southeastern part, Puruktjahu, 150 m, *F.R.I.* bb. 11003. Balikpapan, *Coert* B 95. Eastern part, Sangkulirang Distr., Mt Medadem, 450 m, *Kostermans* 13443.

var. *kunstleri* (K. & G.) Sleum., nov. stat. — *V. kunstleri* K. & G., J. As. Soc. Beng. 74, ii, 1905, 65; *Ridl.*, J. R. As. Soc. Str. Br. 79, 1918, 92. — *V. breviflos* *Ridl.*, J. Fed. Mal. St. Mus. 6, 1915, 9. — *V. bancanum* (non *Miq.* s. str.) K. & G., J. As. Soc. Beng. 74, ii, 1904, 64, p.p.; *Ridl.*, Fl. Mal. Pen. 2, 1923, 209, p.p.; *Burk. & Henders.*, Gard. Bull. Str. S. 3, 1925, 390.

SUMATRA. Atjeh, confluence of R. Kapi and R. Aunan, 1100—1250 m, *Van Steenis* 9978. East coast, NE Mt Sibajak near Bandar Baru, 950 m, *Lörzing* 15815 (BO).

MALAY PENINSULA. Perak, Maxwells Hill, c. 1065 m, *Scortechini* 39 (BO; CAL, lectotype of *V. kunstleri*, not seen), 428 (BM; K, isosyntype of *V. kunstleri*). Thaiping Hill, 1065—1370 m, *For. Dep. F.M.S.* 1376 *Yeob*; *Kunstler* 8415 (BM, FI, G, K, SING, isosyntype of *V. kunstleri*); *Haniff & Nur* SF 2360. G. Hijau, 1400 m, *Anderson* 49; *Kunstler* 7018. Birch's Hill, 1280—1310 m, *Burkill & Haniff* SF 12573, 12620. Larut Hill, 1220—1370 m, *Derry* (*Herb. Curtis*) 3702; *C.F.* 33 *Barnard* (KEP). Cameron Highlands, 1400 m, *Henderson* SF 23548; *For. Dep. F.M.S.* 28105 *Jaamat*; *ibid.*, Sg. Bertam, *For. Dep. F.M.S.* 29342, 36264 *Sow*. Selangor, B. Nuang (Mt Menuang), E of Kuala Lumpur, 915—1495 m, *B. Kloss* 293 (BM, type of *V. breviflos*).

var. *tenuinervium* J. J. S. in K. & V., *Bijdr.* 13, 1914, 157, 159; *Amsh.* in *Back.*, *Bekn. Fl. Java* (em. ed.) 7, 1948, fam. 163, p. 3. — *V. bancanum* (non *Miq.* s. str.) *Clarke* in *Hook. f.*, Fl. Br. Ind. 3, 1882, 454, p.p., quoad pl. malacc.; *Ridl.*, J. Str. Br. R. As. Soc. 39, 1903, 14; K. & G., J. As. Soc. Beng. 74, ii, 1905, 64, p.p.; *Koord.-Schum.*, Syst. Verz. 1, 1912, fam. 233, p. 108; *Koord.*, Exk. Fl. Java 3, 1912, 19; *Burk. & Holtt.*, Gard. Bull. Str. S. 3, 1923, 58; *Ridl.*, Fl. Mal. Pen. 2, 1923, 209, p.p.; *Henders.*, J. Mal. Br. R. As. Soc. 5, 1927, 255; *Gard. Bull. Str. S.* 4, 1928, 280; *Steen.*, Arch. Hydrobiol. Suppl. 11, 1932, 318; *Bull. Jard. Bot. Btzg* III, 13, 1933, 53. — *V. micrantherum* *Stapf*, Trans. Linn. Soc. ser. 2 Bot. 4, 1894, 190;



Merr., En. Born. 1921, 467; Heine in Fedde Rep. 54, 1951, 245 ('*micranthum*'). — *V. ardisioides* Ridl., J. Fed. Mal. St. Mus. 5, 1914, 37, non Wernh. (1916). — *V. kunstleri* (non K. & G.) Ridl., J. Fed. Mal. St. Mus. 6, 1915, 156. — *V. eburneum* Ridl., J. Fed. Mal. St. Mus. 7, 1916, 45; l. c. 10, 1922, 249; Henders., Gard. Bull. Str. S. 4, 1928, 280. — *V. ardisiiflorum* Ridl., J. Str. Br. R. As. Soc. 79, 1918, 91 ('*ardisiiflora*'). — *V. wrayi* Ridl., J. Str. Br. R. As. Soc. 79, 1918, 92.

SUMATRA. Atjeh, Putjuk Angasan, 1800—2500 m, *Van Steenis* 8285, 8396. Lau Alas R.-Blangkedjeren, 1800—2600 m, *Van Steenis* 8710, 8738, 8760. G. Kemiri, 2900 m, *Van Steenis* 9720. Between summit G. Lembuh and bivouac 'Halfweg', 1850—3000 m, *Van Steenis* 8987, 8989, 9023, 9183, 9155. G. Losir, 2100—2250 m, *Van Steenis* 8446. East coast, Bila, Aek Buro, on Mt Manalese, 200 m, *Lörzing* 11604. Tapanuli, Pangururan, solfataras, *Surbeck* 175. Simelungan country, E of Toba Lake, *Bangham* 1297. Toba-Samosir, *Ruttner* 51. Pusuh Bukit volcano, 950 m, *Van der Meer Mohr* s.n. Batakland, Mt Sibulaboali, 915—1220 m, *Junghuhn* s.n. West coast, Brani, 950 m, *Bünnemeijer* 3156. Mt Sago, near Pajakumbuh, 1400—1600 m, *Meijer* 3674, 5118, 5885, 5902.

MALAY PENINSULA. Kedah, G. Jerai (Kedah Peak), 610—1220 m, *Ridley* s.n. (June 1893, as '*V. hasseltii* Miq.'). *For. Dep. F.M.S.* 27455 *Wilkinson*; *Haniff & Nur* SF 4738; *For. Dep. F.M.S.* 46919 *Symington*; *For. Dep. F.M.S.* 17921 *Meh*; *Lobb* s.n.; *Evans & Gordon* 78; *F.M. St. Mus.* 13005 *Robinson & B. Kloss* (= *Robinson & B. Kloss* 5986, K, type of *V. eburneum*; SING). Kelantan, G. Stang, *For. Dep. F.M.S.* 37741 *Symington*. Perak, Upper Chupui valley, 610 m, *For. Dep. F.M.S.* 25406 *Symington*. G. Korbu, 1830 m, *For. Dep. F.M.S.* 32138 *Symington*. G. Babu, 1370 m, *Wray* 3912 (G). Penang, *Hooker* anno 1854 (K). Pahang, Kluang Terbang, *Barnes* (*Herb. Ridley* 10895). Bt. Raka, *For. Dep. F.M.S.* 40504 *Symington*. G. Batu Brinchang, 1525 m, *For. Dep. F.M.S.* 36534 *Jaámat*; *Whitty & Henderson* SF 18036. Ulu Tembeling, 450 m, *For. Dep. F.M.S.* 31533 *Lipis*. Ulu Batang, 1495 m, *Wray* 1528 (K, type of *V. wrayi*). Cameron Highlands, *Batten Pool* s.n.; *ibid.*, Myrtle Hill, 1525 m, *For. Dep. F.M.S.* 20994 *Symington*; G. Berumbun, *For. Dep. F.M.S.* 31012 *Symington*; Taman Sedia, *For. Dep. F.M.S.* 36103 *Symington*. Frazer Hill, 1220—1330 m, *Burkill & Holtum* SF 8928; *For. Dep. F.M.S.* 29487 *Symington*. G. Tahan, *Ridley* 16054 (K, '*V. kunstleri*'). Selangor, Klang Gates, 425 m, *Ridley* s.n.; *For. Dep. F.M.S.* 33206, 33217, 39404 *Symington*; *Brooks* 19. Kanching For. Res., C.F. 6545 *Foxworthy*; *For. Dep. F.M.S.* 29840, 36610 *Symington*; *For. Dep. F.M.S.* 12917 *Foxworthy & Burkill*. G. Mengkuang Lebah, 1525 m, *Robinson* s.n. (K, type of *V. ardisioides* resp. *V. ardisiiflorum*; SING). Malacca, G. Tandak, Mt Ophir, *Ridley* 10073; *Maingay* 2509 (= K.D. 699).

BORNEO. Sarawak, Mt Poi, summit, 1830 m, *Clemens* 20034. Bako National Park, 105—120 m, *Purseglove* 4916, 5539; *ibid.*, Ulu Serait, *Anderson* 12481, in Kerangas forest. Kuching, G. Bungoh, 915 m, *For. Dep. Sarawak* 9521 *Brunig*. Sibul Distr., Rantau Panjang to Teku, 15 m, *Anderson* 9866 (K). North Borneo, Mt Kinabalu, 1065 m, *Haviland* 1296 (K, type of *V. micrantherum*; L, SAR, SING); *Clemens* 10335 (cit. Merr., not seen), 10788, 27102, 28627, 29925, 29952; *Carr* SF 26961, 26978. Central part, Ulu Kenepai, *Hallier* 1467; *Chaper* anno 1890.

JAVA. Preanger/Djakarta, Tjigenteng, 1500—1700 m, *Koorders* 9919 (syn-type of *V. bancanum* var. *tenuinervium*), 24219 (A; BO, lectotype of *V. bancanum* var. *tenuinervium*; K, L, P, U, partly distributed sub '24217': K, L, P). Tombak Rujong near Tjikandari, *Reinwardt* s.n. G. Masigit, 2050 m, *Backer* 12395. G. Patuha, 1500—1700 m, cit. *Amshoff* in *Backer*, not seen.

var. *kemulense* J. J. S., msc. — Folia ovato-elliptica, breviter obtuse acuminata, 3—4 cm longa, 1.5—2 cm tantum lata; cetera ut in var. typ.

BORNEO. North Borneo, Mt Kinabalu, Tenompok, 1525 m, *Clemens* 29856; *Carr* SF 26883. Central Eastern part, W. Kutei, Mt Kemul, 1600 m, *Enderit* 4356 (A; BO, type; L).

Forms approaching var. *kemulense* are found near solfataras in N. Sumatra.

160. *V. luzoniense* Vid., Rev. Pl. Vasc. Filip. 1886, 168; Ceron, Cat. Pl. Herb. Manila, 1892, 105; Merr., Philip. J. Sc. 3, 1908, Bot. 377; En. Philip. 3, 1923, 250; Copel. f., Philp. J. Sc. 42, 1930, 570, pl. 4, f. 3—6.

PHILIPPINES. Luzon, Mountain prov., Benguet subprov., Baguio, *Williams 1296*; *F. B. 5143 Curran*; Pauai, *B. S. 31800* (cit. '31880') *Santos*. Loo, *Loher 3775*; Mt Santo Tomas, *Loher 3776*; *Sinclair & Edano 9706*. Lepanto subprov., *Vidal 1535* (K, type). Mancayan, *F. B. 10932 Curran* (PNH, †, cit. Copel. f., not seen). Ifugao and Bontoc subprov., *F. B. 29410 Zschokke & Laraya*.

161. *V. tenuipes* Merr., Philip. J. Sc. 3, 1908, Bot. 375; En. Philip. 3, 1923, 251; Copel. f., Philip. J. Sc. 42, 1930, 571, pl. 4, f. 7—8. — *V. sp.*, Merr., Philip. J. Sc. 2, 1907, Bot. 295.

PHILIPPINES. Luzon, Cagayan prov., Caua volcano, c. 900 m, *Clark s.n.* (PNH, lectotype, chosen by Copel. f., †); Bauan-Mt Tabuan, *B. S. 77084 Ramos*. Mountain prov., Benguet subprov., Mt Pulog, *B. S. 45021 Ramos & Edano*; Mt Pulogloco, *B. S. 40404 Ramos & Edano*. Ifugao or Bontoc subprov., South Inomin, *F. B. 29412 Zschokke & Laraya*. Rizal prov., Montalban, *Loher 12665*; Angilog, *Loher 14173*. Mindoro, Mt Halcon, 1500 m, *Merrill 6133* (PNH, syntype, †); Ibolo R., 600 m, *F. B. 11485 Merritt* (PNH, syntype, †). Panay, Capiz prov., Jamindan, *B. S. 30867 Ramos & Edano*. Negros, Oriental prov., Cuernos Mts, 1200 m, *Elmer 9819* (PNH, syntype, †), *10108* (BM, BO, FI, K, L; US syntype and neo-lectotype, cit. Copel. f., not seen).

162. *V. filipes* Schltr, Bot. Jahrb. 55, 1918, 176; Sleum., l. c. 72, 1942, 252.

NEW GUINEA. Northern part, Sepik Distr., Schrader Mts, 2070 m, *Ledermann 11938* (B, lectotype, chosen by Sleumer in 1942, †); West Range, 'Lager Felsspitze', 1400—1500 m, *Ledermann 12951* (B, syntype, †; K, neo-lectotype). Hunstein Range, 'Lordberg', 1000 m, *Ledermann 9874a* (B, †).

163. *V. mollissimum* Sleum., Bot. Jahrb. 72, 1942, 266.

NEW GUINEA. Western part, Wissel Lake region, *Eyma 5055*. Eastern part, Western Highlands, Minj subdistr., Minj valley, 2135 m, *Robbins 572*. Eastern Highlands, Goroka subdistr., Upper Asaro valley, 2135 m, *Pullen 514*; Mt Wilhelm, E slopes, 2770 m, *Brass 30416*; Dengalagu Mission, near Keglsugl, 2135 m, *N. G. F. 8977 Womersley*. Morobe Distr., Wau, Edie Creek, 1830—1900 m, *N. G. F. 4784 Womersley & Taylor*; *N. G. F. 5377 Womersley & Ingle*; *N. G. F. 11034 Womersley & Brass*; *Brass 29142*. Centr. Distr., Mt Tafa, 2400 m, *Brass 4869* (A; NY, type, † in B; L).

164. *V. molle* J. J. S., Nova Guinea 12 (2), 1914, 165, t. 51; l. c. 18, 1936, 117; Sleum., Bot. Jahrb. 72, 1942, 248; Kaneh. & Hatus., Bot. Mag. Tokyo 56, 1942, 481.

NEW GUINEA. Northwestern part, Arfak Mts, Angi Lakes, 1800—2200 m, *Gjellerup 1077* (BO, type; L); *Kostermans 2141, 2253, 2448*; *Kanehira & Hatusima 14010*. Angi Gita, Mt Tombrok, 2300 m, *Bergman s.n.* (S); Mt Koebré, 2300 m, *Kanehira & Hatusima 13681*.

Similar in general and probably related, but leaves smaller and glabrescent except the lower part of the midrib beneath, stamens but 3 mm, corolla hairy in the upper part inside (not glabrous as in *V. molle*), material too poor for description:

NEW GUINEA. Northern part, Doormantop, 3250 m, *Lam 1601* (BO, L).

165. *V. costerifolium* Sleum., nov. spec. — *V. varingiaefolium* (non (Bl.) Miq.) Miq., Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 38, quoad specim. born.; Merr., En. Born. 1921, 467. — Frutex prostratus vel (interdum altius) subscandens, caulibus gracilibus. Ramuli teretes, 1—4 mm diam., laxe lenticellati,

minute patenter puberuli, in sicco saepius rubescentes, elongati, laxe foliati. Folia normalia oblongo-elliptica vel oblonga, interdum elliptica, apice breviter sensim obtuse attenuata, basillate in petiolum gracilem attenuata, paullo supra basin utroque latere glandulis marginalibus sat parvis 1 vel 2 ornata, interdum hic inde altius glandulis ceteris marginalibus paucis instructa, tenuiter coriacea, glabra, subtus minute laxequae glanduloso-muriculata, supra in sicco cineroviridia vel plumbea, subtus dilute brunnescentia, integra, margine parum revoluta, 5—8 cm longa, 2—3,5 cm lata, superiora vel in ramulis lateralibus obvia forma similia, sed longitudine sensim usque ad 1,5 cm, latitudine usque ad 0,5 cm decrescentia, glandulis marginalibus numerosioribus instructa, omnia utroque latere nervis 2 e basi vel parum supra basin (0,5—1 cm) exeuntibus alteque curvato-ascendentibus sub 5-plinervia, ultro interdum nervo uno alterove altius a costa abeunte instructa, nervis supra in foliis bene maturis impressis, subtus prominentibus, rete venularum utrinque parum elevato, vel haud raro subobscurum; petioli sat graciles, 2—3 mm longi, rugulosi. Racemi ex axillis ramulorum juniorum orti, ascendentes, laxae multiflori; rhachis gracilis vel gracillima, angulata, sicut pedicelli minute patenti-puberula, sub anthesi eperulata, 5—10 cm longa. Pedicelli graciles, (3—)4—5(—6) cm longi, bractea lanceolata 3—6(—8) mm longa et c. 2 mm lata sub anthesi plerumque iam caduca fulti. Calyx dense breviter pubescens laxiusque glanduloso-muriculatus, tubo cupulato, 1—1,5 mm longo, limbo suberecto, profunde 5-partito, lobis deltoideis 2—2,5 mm longis, quam tubus minus dense pilosi, glandula apicali nulla. Corolla urceolato-tubulosa, fauce parum contracta, tenera, rosea usque saturate purpurea, odorata, (8—)9—10 mm longa, c. 4 mm diam., extus omnino, intus ad basin tantum puberula, lobis obtusis suberectis c. 1 mm longis. Stamina 10; filamenta linearia, sed supra basin dilatata, basi dense, superne laxius et subpatenter pilosa, infra thecas glabra, c. 3 mm longa; thecae oblongae, granulatae, 1,2—1,3 mm longae, breviter obtuse bicalcaratae; tubuli cylindrici, thecis angustiores, superne paullo dilatati, 1—1,3 mm longi, apice suboblique abscissi, pariete postico cuiusque tubuli in dentes 1—2 brevissimos extenuato et recurvato. Discus prominens, glaber vel laxe pilosus. Stylus columnaris, glaber, 0,9—1 cm longus. Bacca subglobosa, c. 6 mm diam., laxe pubescens, intense rubra, matura nigrescens.

BORNEO. Southern part, 12 km E of Sampit, near sealevel, *Alston 13143* (BM, type), fl. fr. 21-1-1954; *ibid.*, *Alston 13143a*; Sampit, c. 5 m, *Buwalda 7689* (BO), fr. imm. 2-9-1940; Sampit region, Kualaakajan, 30 m, *Kostermans 7987*; *ibid.*, Telang, Dusun R., *Grabowski a. 1881* (BM); Dusun R., *Korthals s.n.* (L, '*V. varingiaefolium*'). Banjarmasin, *Motley 906* (K). No locality given, *Jaheri 40* (BO).

Very similar in appearance, but flowers galled, not sure if really conspecific, said to be a tree of 15 m, trunc 30 cm, flowers white:

BORNEO. Eastern part, Sangkulirang Distr., Mt Medadam, 450 m, on limestone, *Kostermans 13443*.

166. *V. brachytrichum* Sleum., nov. spec. — *V. foxworthii* Copel. f., Philip. J. Sc. 42, 1930, 580, p.p. — Frutex. Ramuli graciles, angulati, brevissime pubescentes, subdense foliati. Folia elliptica, apice breviter obtuse attenuata vel subacuminata, basi  $\pm$  late attenuata brevissimeque in petiolum decurrentia, utroque latere glandula minuta subimpressa marginali a petiolo c. 1 mm remota instructa, tenuiter coriacea, firma, glabra, supra in sicco lucidula, subtus opaca,



integra, imprimis basin versus paullo revoluta, 2,5—3,5 cm longa, (1—) 1,2—1,8(—2) cm lata, costa supra leviter impressa, subtus prominente, nervis lateralibus utroque latere 1(—2) basalibus vel parum suprabasalibus et 2—3 brevioribus altius a costa abeuntibus similiter curvato-ascendentibus et anastomosantibus, supra plerumque parum conspicuis, subtus paullo prominentibus, reticulatione laxa subtus tantum prominula; petioli applanati, (1—) 2 mm longi, 1—1,3 mm crassi. Racemi ex axillis summis solitarii, laxe 5—8-flori, in omnibus partibus exterioribus dense brevissime pubescentes vel hirtelli; rhachis subgracilis, 2—3 cm longa, basi perulis paucis ovato-acuminatis, c. 2 mm longis circumdata. Pedicelli graciles, 3—5 mm longi, basi caduce bibracteolati. Calyx tubo campanulato, 1,3 mm longo, limbo erecto-patente 1 mm longo fere usque ad basin 5-lobo, lobis ovato-acuminatis, ciliatis, hic inde glandula marginali minuta instructis, glandula apicali carentibus. Corolla urceolata, 5—6 mm longa, c. 2,5 mm diam., extus omnino, intus ad partem dimidiam inferiorem tantum dense breviter pubescens, lobis obtusis reflexis 1 mm longis. Stamina 10, c. 3,5 mm longa; filamenta subulata, dense pilosa, 2,5 mm longa; antherae c. 1 mm longae, thecis ovato-oblongis ecalcaratis, tubulis cylindricis thecis angustioribus brevissimis c.  $\frac{1}{3}$  thecarum longitudine aequantibus, subcurvatis, suboblique abscissis, exappendiculatis. Discus dense pilosus. Stylus graciliter columnaris, ad  $\frac{3}{4}$  inferiorum partem dense hirsutulus, 5 mm longus. Bacca immatura globosa, breviter pubescens, c. 4 mm diam., disco pubescente lobisque calycinis suberectis coronata.

PHILIPPINES. Palawan, Mt Capoas, c. 1000 m, fl. fr. Apr. 1913, B.S. 9526 Merrill (BM, BO, GH, K; L, type; NY, P, SING; US, cit. Copel. f., not seen).

Similar, but leaves narrower; not sure if conspecific:

PHILIPPINES. Palawan, Mt Pulgar, Elmer 13202, fr.

167. *V. rigidifolium* Sleum., nov. spec. — Frutex. Ramuli validi, dense breviter patenter pilosi usque subtomentosi, dense foliati; gemmae axillares subglobosae. Folia elliptica, rarius subovata vel oblongo-elliptica, apice brevissime obtuse attenuata, plerumque (sub)rotundata, basi  $\pm$  rotundata sed ima basi subabrupte in petiolum contracta, ad ipsam basin utroque latere glandula marginali crassa (interdum glandulis remotis duabus) instructa, coriacea, novella utrinque imprimis ad costam et marginem pubescentia, utrinque in facie laxius glanduloso-muriculata, aetate gradatim glabrescentia, matura supra glabra et lucidula, in sicco pallide olivacea, subtus ad costae inferiorem partem tantum flavescenti-pilosa, in facie glanduloso-punctulata vel denique epunctata, integra, margine parum vel vix revoluta, 3—5(—6,5) cm longa, 2—3,3 cm lata, costa supra sat anguste impressa, subtus inferne petioli crassitudine valdeque prominente, superne sensim diminuta usque evanescente, nervis utroque latere 4—5, infimis e basi laminae, superioribus pinnatim a costa abeuntibus, omnibus curvato-ascendentibus et praeter marginem anastomosantibus, supra in foliis maturis haud vel parum impressis, subtus parum prominentibus, reticulatione subdensa subtus tantum paullo elevata; petioli crassi, valde applanati, supra sulcati, 2—5 mm longi, 2—3 mm lati, dense pilosi. Racemi ex axillis superioribus saepius numerosioribus orti, oblique patentes, dense multiflori, floribus nutantibus, in omnibus partibus dense breviter (in sicco flavescenti-) pilosi vel -subtomentosi; rhachis rigida, angulata, 4—8 cm longa, 1,5—2 mm crassa, sub anthesi iam eperulata. Pedicelli rigidi, sub anthesi 2—3 mm longi, fere 1 mm

diam., bractea basali haud visa, bracteolis subulatis in medio pedicello vel altius instructis 1—1,5 m longis, cito caducis. Calycis tubus cupulatus, 1 mm altius, limbus suberectus profunde 5-partitus, lobis ovato-deltaideis 1—1,5 mm longis, dorso sicut pedicelli et rhachis dense pilosis, vel imprimis superne cito glabratis, per marginem glandulis sessilibus crassis in sicco nigricantibus, interdum in glandulam marginalem unicam connatis instructis. Corolla cylindrico-urceolata, leviter 5-angulata, carnosula, rosea, 6—7 mm longa, 2—3 mm diam., extus inferne dense, superne laxius vel ad angulos tantum, intus in inferiore parte tantum breviter caduce flavescenti-pilosa, denique  $\pm$  glabrescens, lobis obtusis reflexis 1 mm longis. Stamina 10; filamenta subulata, inferne dilatata, basi ipsa glabra, superne ad partem dilatatam villosa, apice laxius pilosa, c. 2 mm longa; thecae oblongae ecalcaratae, c. 1,2 longae; tubuli thecis circa dimidio angustiores, cylindrici, 1,3—1,5 mm longi, apice suboblique scissi, pariete postico breviter elongato et 2-denticulato. Discus prominens, superne dense erecto-pilosus. Stylus columnaris, ima basi laxe usque densius pilosus, ceterum sparse pilosus vel glaber, 4,5—5,5 mm longus. Bacca depresso-globosa, glabrescens, 5—6 mm diam., disco parcepiloso a calycis lobis haud tecto coronata, pedicello glabrescente 3—5 mm longo.

SUMATRA. Atjeh, Gaju & Alas Lands, G. Lembuh, c. 3000 m, fl. 21/22-2-1937, *Van Steenis 9131* (A, BO, K; L, type); *ibid.*, G. Lembuh to bivouac 'Halfweg', 3000—1850 m, *Van Steenis 9158*.

A form with larger leaves (up to 6,5 cm in length) and longer petioles (5—8 by 2—3 mm):

SUMATRA. Atjeh, Mt Kemiri, 3100 m, *Van Steenis 9613*; Mt Losir, 2700—3500 m, *Van Steenis 8520, 8652*.

168. *V. summifaucis* Sleum., Bot. Jahrb. 72, 1942, 251.

NEW GUINEA. Southeastern part, Centr. Distr., Owen Stanley Range, above the 'Gap', 2040—2440 m, *Carr 13757, 13847, 15016* (A; B, type, †; BM, K, L, SING), *15274, 15279*.

169. *V. cuneifolium* (Bl.) Miq., Fl. Ind. Bat. 2, 1859, 1062; Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 37, incl. var. *acutum* Miq., l. c. ("*acuta*") ; Bl. & Fisch., Fl. Javae Pl. inéd. 1863/83, t. 20; Koord., Minah. 1898, 514; Exk. Fl. Java 3, 1912, 19; Koord.-Schum., Syst. Verz. 3, 1914, 100; J. J. S. in K. & V., Bijdr. 13, 1914, 136, in text. — *Thibaudia cuneifolia* Bl., Bijdr. 1826, 861; Hassk., Cat. Hort. Bot. Bog. 1844, 161. — *Agapetes cuneifolia* (Bl.) G. Don, Gen. Syst. 3, 1834, 863. — *Vaccinium* ? *bancanum* (non Miq.) Koord., Minah. 1898, 513.

CELEBES. Northern part, Menado, G. Klabat, (1000—)1300—2000 m, *Reinwardt s.n.* (L, type of *Thibaudia cuneifolia*); *Steup 157, 166; Koorders 19223, 19442, 19443, 19446, 19447*. Soputan Mts, *Koorders 19440*. G. Lolombulan, top, 1200 m, *Koorders 19441*. Kakaskasen to top G. Lokon, 1100—1400, *Koorders 19444*. G. Mahawu, Tomohon, 1200 m, *Forsten s.n.* (L, type of *V. cuneifolium* var. *acutum*); *Forman 402*.

170. *V. vidalii* Merr. & Rolfe, Philip. J. Sc. 3, 1908, Bot. 374; Merr., En. Philip. 3, 1923, 252; Copel. f., Philip. J. Sc. 42, 1930, 582, pl. 5, f. 10—11.

PHILIPPINES. Luzon, Cagayan prov., Bauan, Mt Tabuan, *B.S. 77082 Ramos*. Mountain prov., Apayo subprov., Mt Magnas, 850 m, *PNH 19753 Edano*. Nueva Ecija prov., Carballo Mts, *Vidal 3144*. Rizal prov., *Loher 12245*; Balabac, *Loher 13005*; Montalban, *Loher 12755, 12936* (UC, cit. Copel. f., not seen); Mt Lumutan, *B.S. 29618*

*Ramos* & *Edano*; Mt Tokduanbanoy, B. S. 48578 (cit. '45878') *Ramos* & *Edano*. Zambales prov., Mt Tapulao, 1400 m, F. B. 8256 *Curran* & *Merritt* (NY; PNH, lectotype, †; US, cit. Copel. f., not seen); B. S. 4765 *Ramos* (syntype: BO, K, NY); B. S. 5132 *Ramos* (syntype: BO); *Loher s.n.* (PNH, †).

171. **V. amphoterum** Sleum., nov. spec. — Frutex vel arbor parva, 1—6(—12) m alta. Ramuli erecti, haud raro ad apices ramorum 2—4 dense aggregati, in partibus novellis tantum subteretes, striati minuteque puberuli, ceterum cito glabrescentes et corticati, sat dense foliati, in partibus vetustioribus laxè subrotundato-lenticellati. Folia elliptica vel subovato-elliptica, apice brevius vel longius (0,5—1 cm) subabrupte acuminata, subacuta, basi  $\pm$  late in petiolum attenuata, utroque latere paullo supra basin glandulis marginalibus 1—2 bene impressis instructa, ultro superne glandulis similibus paucis minus distinctis inter sese remotis usque ad laminae apicem ornata resp. subcrenulata, primo visu integra, coriacea, glabra, subtus laxè minuteque glanduloso-muriculata, parum nitentia, 3—4,5 cm longa, 2—2,5(—2,8) cm lata, margine ipso parum revoluta, costa supra impressa, subtus inferne petioli crassitudine valdeque elevata, superne sensim decrescente, nervis lateralibus utroque latere 2 basalibus vel paullo suprabasalibus alteque ascendentibus, et 2—3 superioribus a costa abeuntibus brevioribus, omnibus curvatis interque sese anastomosantibus, supra in foliis plane maturis minute impressis, subtus prominentibus, reticulatione sat densa subtus tantum prominula; petioli a dorso appianati et sulcati, initio puberulenti, 4—7 mm longi, c. 1 mm crassi. Racemi ex axillis summis 2 vel 3 orti, suberecti, laxè 6—12-flori, floribus secundis; rhachis angulata, subgracilis, minute patenter puberula disperseque glanduloso-muriculata, 3—5 (—6) cm longa, eperulata. Pedicelli crassiusculi, epilosi, inferne laxissime, apice densius glanduloso-muriculati, 7—11 mm longi, basi bracteis oblongis acutis foliaceis membranaceis sub anthesi  $\pm$  persistentibus rarius cito caducis 8—12 mm longis, 2—4 mm latis fulti, bracteolis haud visis. Calyx cupulatus, basi rotundatus, dense pilis minutis et glandulis muriculatis obtectus, tubo 1—1,5 mm longo, limbo 0,5 mm tantum alto, margine undulato vel brevissime obtuse 5-lobulato, lobis saepius glandula tantum crassa interdum penicillata apicali recognoscendis. Corolla tubuloso-urceolata, carnosula, rosacea, extus intusque glabra, 7—8 mm longa, 3—4 mm diam., lobis deltoideis obtusis vix 1 mm longis demum reflexis. Stamina 10, alternatim paullo inaequilonga; filamenta subulato-linearia, inferne dense pilosa, superne glabra, c. 3 mm longa; thecae oblongae, 1—1,2 mm longae, ecalcaratae; tubuli erecti, cylindrici, thecis paullo angustiores, c. 0,8 mm longi, apice oblique scissi, pariete postico in dentem brevem extenuato. Discus depressus, laxè vel dense ad marginem interiorem breviter erectopilosus. Stylus columnaris, glaber, c. 7 mm longus, haud exsertus. Bacca depresso-globosa, pilosa et glanduloso-muriculata, 5—6 mm diam., pedicello haud accrescente, calycis lobis saepius inflexis, bracteis saepius omnino caducis.

NEW GUINEA. Southeastern part, N slopes of Mt Dayman (Mt Maneao), 2250 m, fl. 16-6-1953, *Brass* 22942 (A, type; L), frequent in ferny regrowth of burned mossy forest; *ibid.*, 2300 m, *Brass* 22902 (differs by a penicillate apical gland of the calyx lobe and a glabrous disk); *ibid.*, 2150 m, *Brass* 22730, fr.; *ibid.*, 2230 m, *Brass* 22299, fl. fr.; *ibid.*, 2750 m, *Brass* 22271, fr. (disk glabrous).

172. **V. banksii** Merr., Publ. Gov. Lab. Philip. 35, 1906, 54; Philip. J. Sc. 3, 1908, Bot. 372; En. Philip. 3, 1923, 248; Copel. f., Philip. J. Sc. 42, 1930, 590.



PHILIPPINES. Negros, Occidental prov., Canlaon volcano, c. 1300 m, *Banks s.n.* (PNH, type, †); *ibid.*, c. 2000 m, *Merrill 223* (FI, G; PNH, †; US, neotype, cit. Copel. f., not seen); *ibid.*, summit, 1960 m, *PNH 21959 Edano*.

173. *V. apophysatum* Sleum., nov. spec. — *V. ? vidalii* (non Merr. & Rolfe) Lam & Holthuis, *Blumea* 5, 1942, 224. — Frutex terrestris usque ad 3 m altus, valde ramosus. Rami teretes, sat validi, sparse lenticellati; ramuli inter graciliores, apicibus puberuli, glabrescentes, subdense foliati. Folia elliptica usque oblongo-, interdum subobovato-elliptica, apice obtuse attenuata usque rotundata, basi late attenuata vel subrotundata, subcoriacea, supra in sicco cinerascens-olivacea,  $\pm$  lucidula, subtus dilute brunnea, opaca, glabra, glandulis impressis utroque latere 5—8 per totam marginem remote distributis crenulata, 1,5—2,5(—3,5) cm longa, (0,8—)1—1,5(—2) cm lata, costa nervisque utrinque parum prominentibus, nervis lateralibus 4—5-paribus, anastomosantibus, reticulatione subinconspecta; petioli rugulosi, 1—2 mm longi. Inflorescentiae in statu fructifero juvenili tantum visae, glaberrimae, corollis paucis siccis conservatis. Racemi laxi, 3—5-flori; rhachis gracilis, 1—2 cm longa, angulata. Pedicelli sat graciles, 6—8(—15) mm longi, bracteis bracteolisque haud visis. Calycis tubus campanulatus, basi subito in pedem brevissime sed manifeste contractus, in sicco 5-angulatus, sub limbo paullo contratus, 1—1,5 mm longus, c. 2 mm diam., limbo erecto-patenti profunde 5-lobato, vix 1 mm longo, lobis late ovatis apice rotundatis, ciliatis glandulaque distincta apiculatis. Corolla cylindrico-urceolata, tenera, alba, rosea vel rubra, extus intusque glabra, 5 mm longa, c. 2,5 mm diam., lobis obtusis reflexis vix 1 mm longis. Stamina 8, c. 2,8 mm longa; filamenta subulata, subdense longepilosa, 1,8 mm longa; thecae oblongae, ecalcaratae, c. 0,8 longae; tubuli thecis paullo graciliores, apice oblique truncati, c. 0,8 mm longi. Stylus glaber, 4 mm longus. Discus glaber. Bacca submatura c. 5 mm diam.

MOLUCCAS. Talaud Isl., Karakelang, E slope of G. Piapi, 400 m, *Lam 3259, 3274* (BO, K; L, type; LAE), fl. 31-5-1926.

174. *V. woodianum* Copel. f., Philip. J. Sc. 42, 1930, 591. — *V. banksii* (non Merr. 1906) Merr., Philip. J. Sc. 2, 1907, Bot. 255, 293.

PHILIPPINES. Mindoro, Mt Halcon, 2700 m, *Merrill 5506* (NY, flowers partly galled; PNH, type, †; US, cit. Copel. f., not seen).

175. *V. cumingianum* Vid., Rev. Pl. Vasc. Filip. 1886, 167; Merr., Philip. J. Sc. 1, 1906, Suppl. 112; l. c. 3, 1908, Bot. 375; En. Philip. 3, 1923, 248; Copel. f., Philip. J. Sc. 42, 1930, 584, pl. 6, f. 1—3, incl. var. *tayabasense* Copel. f., l. c. 585. — *V. microphyllum* (non Bl.) F.-Vill., Noviss. App. 1880, 121, p.p. — *V. sp.* (aff. *V. coriaceo*) Vid., Sinopsis Atlas, 1883, 30, t. 60, f. C. — *V. sp.*, Vid., Phan. Cum. Philip. 1885, 21, 123.

#### var. *cumingianum*.

PHILIPPINES. Luzon, Laguna prov., Mt Banahao, 2000 m, *Cuming 805* (BM, G, K, L, P; PNH, lectotype, †); *Vidal 413, 437*; *Loher 7268*; *F.B. 878 Klemme* (PNH, †); *Whitford 963*; *F.B. 7822* (PNH, †), 7889, 7893 *Curran & Merritt*; *B.S. 6560 Robinson* (PNH, †); *B.S. 19580 Ramos* (UC & US, cit. Copel. f., not seen); *B.S. 75052 Rivera & Dugay* (UC, cit. Copel. f., not seen); *Lukban Cone, Elmer 7788, 9212*; Mt San Cristobal, *Copeland s.n.* (PNH, †). Tayabas prov., Mt Calvario, *F.B. 30060*

(partly distributed sub 30061) *Sulit*. Batangas prov., Lobo Mts, *F.B.* 28049 *Mabesa* (A, BM, PNH, †; UC, type, cit. Copel. f., not seen). Rizal prov., *Loher s.n.* (UC, cit. Copel. f., not seen); Montalban, *Loher* 12305 (UC, cit. Copel. f., not seen), 12152, 12162.

A form with smaller leaves:

PHILIPPINES. Luzon, Tayabas prov., Umiray, *Loher* 14016 (UC, cit. Copel. f., not seen). Rizal prov., Mabiluang, *Loher* 14461 (UC, cit. Copel. f., not seen). Nueva Ecija prov., Mt Umingan, *B.S.* 26305 (cit. '26503', A), 26440 *Ramos & Edaño*.

var. *marivelesense* Copel. f., Philip. J. Sc. 42, 1930, 586. — *V. igorotorum* Copel. f. ex Elm., Leaflet. Philip. Bot. 9, 1933, 3142, nom. nud.

PHILIPPINES. Luzon, Bataan prov., Mt Mariveles, *F.B.* 1330, 1585 *Borden*; *F.B.* 2649 *Meyer*; *Whitford* 245, 459 (K, NY; US, type, cit. Copel. f., not seen); *Merrill Decades* 281; *Merrill* 729. Zambales prov., no locality given, *B.S.* 4783, 5093 *Ramos*; *ibid.*, Mt Pinatubo, *Elmer* 21951, 22248, 22345 ('*V. igorotorum*'); *B.S.* 2535 *Foxworthy*; *Clemens* 17470. Pampanga prov., Mt Abu, *B.S.* 1911 *Foxworthy* (US, cit. Copel., not seen).

var. *igorotorum* Copel. f., Philip. J. Sc. 42, 1930, 586.

PHILIPPINES. Luzon, Mountain prov., Mt Nañgaoto, PNH 7762 *Sulit*. Benguet subprov., *Loher* 5077; *Clemens* 17216; Nagulian, *Loher* 5078 (K); Mt Santo Tomas, *Elmer* 5804 (K, NY, P; US, type, cit. Copel. f., not seen); *Merrill* 4817; *F.B.* 14421 *Darling*; Baguio, *B.S.* 5712 *Ramos* (PNH, †); *F.B.* 18001 *Merritt* (PNH, †); Lusud-Bayabas trail, *F.B.* 10844 *Curran*; Mt Baudan, *B.S.* 40310 *Ramos & Edaño*; Pauai, *B.S.* 4404 *Mearns* (PNH, †); *F.B.* 18367 (cit. '18637') *Alvarez*; *B.S.* 31919 *Santos*; PNH 7486 *Sulit*; Mt Singakalsa, *B.S.* 82427 *Quisumbing & Sulit*. Lepanto subprov., Bauco, *Vanoverbergh* 1232; Mt Sinapsapan, *B.S.* 40457 *Ramos & Edaño*. Bontoc subprov., *Vanoverbergh* 3665 (P); Mt Pukis, *B.S.* 37737 *Ramos & Edano*; Mountain or Nueva Viscaya prov., *F.B.* 15827 *Curran & Merritt* (PNH, cit. Copel., not seen).

var. *pyriforme* (Merr.) Copel. f., Philip. J. Sc. 42, 1930, 586. — *V. pyriforme* Merr., l. c. 2, 1907, Bot. 295; l. c. 3, 1908, Bot. 373; En. Philip. 3, 1923, 251.

PHILIPPINES. Mindoro, Mt Halcon, 1600 m, *F.B.* 4424 *Merritt* (K; PNH, type, †). Panay, Capiz prov., Mt Bulilao, *B.S.* 35714 *Martelino & Edano*. Luzon, Albay prov., Mt Mayon, 1260—2700 m, *B.S.* 6501 *Robinson* (PNH, †); *B.S.* 75714 *Ramos & Edaño*; PNH 18190, 18325, 18335, 18488 *Mendoza*. Camarines Norte or Camarines Sur prov., *F.B.* 21689 *Miranda* (PNH, †).

176. *V. gracile* J. J. S., Med. Rijksherb. 25, 1915, 12; Nova Guinea 12 (5), 1917, 531; l. c. 1918, t. 220; Sleum., Bot. Jahrb. 72, 1942, 254.

NEW GUINEA. Southern part, Hellwig Mts, 1700 m, *Pulle* 704 (BO, type; K, L).

177. *V. tubiflorum* J. J. S., Nova Guinea 12 (2), 1914, 166, t. 52 A; Sleum., Bot. Jahrb. 72, 1942, 250.

NEW GUINEA. Northwestern part, Arfak Mts, Angi Lakes, 2500 m, *Gjellerup* 1196 (BO, type; L).

178. *V. debilescens* Sleum., Bot. Jahrb. 72, 1942, 257.

NEW GUINEA. Northern part, Oranje Mts, 9 km NE of Lake Habbema, 2900 m, *Brass* 10648 (A, BM; L, type); Lake Habbema, 3225 m camp, *Brass* 9307, 9352, 9480.

179. *V. minusculum* Sleum., Bot. Jahrb. 72, 1942, 264.

NEW GUINEA. Southeastern part, Centr. Distr., Mt Tafa, 2300 m, *Brass* 4037 (A, BO, L; NY, type, † in B).

180. *V. viscifolium* K. & G., J. R. As. Soc. Beng. 74, ii, 1905, 63, incl. var. *minus* K. & G., l. c. 6 ('*minor*'); Ridl., J. Fed. Mal. St. Mus. 4, 1909, 41; l. c. 6, 1915, 49; Fl. Mal. Pen. 2, 1923, 207; Dop in Fl. Gén. I-C. 3, 1930, 713; Sleum., Bot. Jahrb. 71, 1941, 452. — *V. perakense* Ridl., J. Str. Br. R. As. Soc. 79, 1918, 92, in obs.; Fl. Mal. Pen. 2, 1923, 207; Burk. & Hend., Gard. Bull. Str. S. 3, 1925, 390; Hend., J. Fed. Mal. St. Mus. 13, 1927, 4; Symington, J. Mal. Br. R. As. Soc. 14, 1936, 355; Fletch. in Craib, Fl. Siam. En. 2, 1938, 313; Sleum., Bot. Jahrb. 71, 1941, 452. — *V. teysmannii* (non Miq.) Ridl., J. Str. Br. R. As. Soc. 39, 1903, 15; K. & G., J. As. Soc. Beng. 74, ii, 1905, 64; Ridl., J. Linn. Soc. Bot. 38, 1908, 313, repr. J. Fed. Mal. St. Mus. 2, 1908, 120; J. Fed. Mal. St. Mus. 6, 1915, 516. — *V. decorum* Ridl., J. Fed. Mal. St. Mus. 5, 1914, 36; Fl. Mal. Pen. 2, 1923, 207. — *V. subobovatum* Fletcher, Kew Bull. 1936, 39; in Craib, Fl. Siam. En. 2, 1938, 314; Sleum., Bot. Jahrb. 71, 1941, 453.

var. *viscifolium*.

INDOCHINA. S. Annam, prov. Nhatrang, N de Ninh-hoa, massif de la Mère et de l'Enfant, *Poilane* 6496.

SIAM. Pattani, Tomo, Kao Ri Chaw, 600 m, *Lakshnakara* 746; Betong, G. Ina, 1200 m, *Kerr* 7587. Surat, Kao Nawng, 800 m, *Kerr* 13290 (BM; K, type of *V. subobovatum*). Nakawn Sritamarat, Kao Luang, 1200—1740 m, *Kerr* 15487; *E. Smith* 728.

MALAY PENINSULA. Perak, G. Kerbau, 300 m, *Haniff* 3986; *ibid.*, G. Bubu, 1370 m, *Scortechini* 428, 443 (BO; K, lectotype of *V. perakense* = '*V. teysmannii*'); *Wray* 1117, 3909. Larut Hill, 1220 m, *Derry* (*Herb. Curtis*) 3703. G. Batu Puteh, 915—1220 m, *Kunstler* 8020. Maxwells Hill, 915 m, *Ridley s.n.* Locality not indicated, *Scortechini* 404 (CAL, lectotype of *V. viscifolium* var. *minus*, not seen; G, K), 405 (BM; CAL, lectotype of *V. viscifolium*, not seen; K); *Wray* 328. Pahang, Cameron Highlands, G. Benom, top, 2100 m, *For. Dep. F. M. S.* 22345 *Strugnell*; *For. Dep. F. M. S.* 10795 *Evans*; path to Jasar, *For. Dep. F. M. S.* 36141 *Symington*; Boh Plantation, 1220 m, *Nur SF* 32629. Kluang Terbang, *Barnes s.n.* Frazer Hill, 1220 m, *For. Dep. F. M. S.* 14630 *Strugnell*. G. Padang, Tahan, *For. Dep. F. M. S.* 42854 *Sow*. G. Tahan, 1000—1980 m, *Ridley* 16053 (cit. '5053'); *Wray & Robinson* 5303; *Corner s.n.*; *Haniff & Nur SF* 7917; *Holtum SF* 20618. P. Tioman, G. Rokam, 835 m, *Nur SF* 18813. Kuantan, G. Tapis, 1400 m, *Symington & Kiah SF* 28853. Johore, G. Blumut, 915 m, *Holtum SF* 10724. Selangor, G. Mengkuang Lebah, 1525 m, *Robinson s.n.* (BM, BO; K, type of *V. decorum*; SING). G. Moyang, 1675 m, *KEP* 56685 *Symington*. Ulu Langat, G. Nuang, 1890 m, *KEP* 51815 *Symington*.

var. *bicalcaratum* Sleum., nov. var. — Folia apice breviter (c. 1 cm) et  $\pm$  obtuse acuminata. Antherae calcaribus dorsalibus 2 distinctis (1 mm longis) ornatae.

MALAY PENINSULA. Pahang/Perak border, Cameron Highlands, near summit of G. Jasar, *For. Dep. F. M. S.* 36131 *Symington* (KEP, type; L, fragm.).

181. *V. loranthifolium* Ridl., J. Str. Br. R. As. Soc. 79, 1918, 91; Fl. Mal. Pen. 2, 1923, 208.

MALAY PENINSULA. Perak, G. Kerbau, 1830—2175 m, *Robinson s.n.* (K, lectotype); *Haniff* 3967 (K, SING, syntype); *For. Dep. F. M. S.* 32106 *Symington*; *For. Dep. F. M. S.* 45894 *Strugnell & Pachun*. Pahang, Cameron Highlands, *For. Dep. F. M. S.* 27024, 27029 *Jaámat*; G. Batu Brinchang, 2030 m, *KEP* 36525 *Jaámat*; *Henderson SF* 23581; *Lancaster s.n.* (L); G. Siku, *For. Dep. F. M. S.* 27656 *Jaámat & Lasa*; G. Irau, summit, 1830 m, *For. Dep. F. M. S.* 36565 *Symington*.

182. *V. scandens* Schltr., Bot. Jahrb. 55, 1918, 179; Sleum., l. c. 72, 1942, 257.



NEW GUINEA. Northern part, Sepik Distr., April R., 'Lordberg', c. 1000 m, *Ledermann 10175* (B, type, †; K, L); *ibid.*, 'Etappenberg', 850 m, *Ledermann 9103* (SING), 9418 (cit. '914', L).

183. *V. littoreum* Miq., Fl. Ind. Bat. Suppl. 1, 1860, 251, 587 (descr.); J. J. S. in K. & V., Bijdr. 13, 1914, 160; Steen., Arch. Hydrobiol. Suppl. 11, 1932, 318, f. 16, 20 & 23 (phot., veget.); Amsh. in Back., Bekn. Fl. Java (em. ed.) 7, 1948, fam. 163, p. 4. — *V. hasseltii* Miq., Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 40; K. & G., J. As. Soc. Beng. 74, ii, 1905, 66 (excl. syn.); Koord., Exk. Fl. Java 3, 1912, 18; Koord.-Schum., Syst. Verz. 1912, fam. 233, p. 109; Hall. f., Med. Rijksherb. 12, 1912, 29; Merr., Philip. J. Sc. 14, 1919, 248; Ridl., Fl. Mal. Pen. 2, 1923, 209, f. 91, incl. var. *sabuletorum* Ridl., l. c. 210; Burk. & Hend., Gard.Bull. Str. S. 3, 1925, 390; Ridl., Kew Bull. 1926, 71; Hend., Gard. Bull. Str. S. 4, 1928, 280; Burk., Dict. 1935, 2217; Hend., J. Mal. Br. R. As. Soc. 17, 1939, 53. — *V. sabuletorum* Ridl., Trans. Linn. Soc. ser. 2 Bot. 3, 1893, 315 ('*sabuletrum*'). — *V. bancanum* (non Miq.) Ridl., J. Str. Br. R. As. Soc. 33, 1900, 103.

SUMATRA. Atjeh, Takengön, 1200 m, *Van Steenis 5812*. Eastcoast, Purbatonga For. Res., 1300 m, *Lörzing 8647*. Balige, 1200—1500 m, *V. d. Koppel 9*; *Posthumus s.n.*; *Bartlett & La Rue 497*. Simelungun, *Bangham 1288*, 1290; *Keers 30*. Dolok B. Merdingding, 1280 m, *Bartlett 8311*. Tinggi Radja, *Jochems 28*. Aek na Uli, near Permangant Siantar, *Alston 15270*; Prapat, Toba Lake, 910 m, *Frey-Wyssling 76*; *Lörzing 7606*; *Bartlett 7145*. Haranggaol, Toba, 1100—1200 m, *Docters van Leeuwen 12882*; *Lesger 302*. Sibolangit, 400—600 m, *Lörzing 3793*, 12054. Tapanuli, Samosir Peninsula, 950 m, *Van der Meer Mohr s.n.*; *Ruttner 49*, 50. Huta Gindjang, Toba, *Bartlett 8345*. Lumban Lobu, Toba, *R. Si Booea 10534*. Solfataras near Pangururan, *Surbeck 148*. Kuta Baleara, Toba, *Pringgo Atmodjo 537*. Tapanuli, 1050 m, *F.R.I. bb. 39*. West-coast, Fort de Kock, Karbouwengat, *Stomps s.n.*; *Jacobson 2085*. Near Siboga, on the coast, *Teysmann H.B. 782* (BO; U, type of *V. littoreum*). No locality given, *Korthals s.n.* Mentawai Isl., Siberut, *B. Kloss SF 14603*; *Iboet 257*.

MALAY PENINSULA. Trengganu, Sg. Paka, *KEP 26786 Symington*; Ulu Brang, 245 m, *Moysey & Kiah SF 33659*. Kelantan, Sg. Tekal, c. 610 m, *Henderson SF 19749*. Perak, Thaiping hill, 900 m, *Haniff & Nur SF 2360*. Larut, 245—300 m, *Kunstler 7515*. Pahang, 10 miles S of Kuantan, *Allen s.n.*; N of Beserah, *Sinclair 8882*. Jambo, *Ridley 1363*. Pekan, *Ridley anno 1889* (BM; SING, type of *V. sabuletorum*). Kluang Terbang, *Barnes s.n.*; Cameron Highlands, 1400 m, *Henderson SF 23548*. Kuantan, Kemaman road, *KEP 76589 Wyatt-Smith*. Johore, Sendai, *Ridley 12211*; Tanjong Bungo, *Ridley 6323*. Selangor, Kanching, 900 m, *For. Dep. F.M.S. 10517 Strugnell*; *For. Dep. F.M.S. 37434 Symington*; *For. Dep. F.M.S. 6545 Foxworthy*. Bt. Takun, *For. Dep. F.M.S. 39588 Symington*. Ulu Gombak, *Hume F.M.S. Mus. 9103*. Singapore, Toas, seashore, *Ridley 2711*, 3030. Bt. Mandai-Kranji, *Ridley 8907*. Kranji, *Ridley 6316*. Changi, *Ridley 5648*. Sg. Morai, *Ridley 6316a* ('*V. bancanum*'). Bt. Timah, *Ridley 6314 p.p.*

Note: *V. littoreum* has been mentioned by Burkill and Henderson from the Kedah Peak, but does not occur there. The Kedah Peak plant belongs to *V. bancanum* Miq. var. *tenuinervium* J. J. S.

BANKA. Leg. Kurz H.K. 2571 (K).

Note: The plant has not been collected on Banka in recent times.

JAVA. Preanger/Djakarta, G. Malabar, 1400 m, *Van der Pijl 251*. G. Sembung, 1200—1300 m, *Backer 12332*. G. Papandayan, *Korthals s.n.* (L, syntype of *V. hasseltii*). Bandung, *Lobb s.n.* (K). No locality given, *Van Hasselt s.n.* (L, lectotype of *V. hasseltii*). Madiun, G. Lawu, Djogolarangan, 1200—1400 m, *Elbert 334*; *ibid.*, Sarangan, *Coert 949*; *Docters van Leeuwen 13084*; *Dorgelo 309*. Malang, G. Ardjuno,

2100—2400 m, *Koorders* 38270; G. Tengger, 1200 m, *Wisse* 536; Nonkodjadja, 1400 m, *Backer* 37102. Besuki, Hijang plateau, 1600 m, *Van Steenis* 11111; G. Lamongan, 1200 m, *Van Steenis* 10669.

184. *V. artum* J. J. S., Nova Guinea 18, 1936, 118, t. 31, f. 2; Sleum., Bot. Jahrb. 72, 1942, 252.

NEW GUINEA. Northern part, Nassau Mts West, 2500 m, *Docters van Leeuwen* 10886 (A, BM; BO, type; K, L, P, SING). Western part, Wissel Lake region, slope and summit of Barara, *Eyma* 5132.

185. *V. habbema* Koord., Nova Guinea 8 (4), 1912, 882, f. 1 ('*habbema*'); J. J. S., l. c. 12 (5), 1917, 530; Sleum., Bot. Jahrb. 72, 1942, 258.

var. *habbema*.

NEW GUINEA. Southern part, Hellwig Mts, Agathodaemon top, 2000—2500 m, *von Römer* 1279 (BO, type); *ibid.*, crest at 2600 m, *Pulle* 953.

var. *parvifolium* J. J. S., Nova Guinea 12 (2), 1914, 162; Sleum., Bot. Jahrb. 72, 1942, 258.

NEW GUINEA. Southern part, Mt Goliath, 3200—3450 m, *De Kock* 99 (BO, lectotype, pres. in alcoh., not seen), 153 (BO, L).

Similar in habit, not sure if conspecific, as flowers are immature, perhaps a proper species.

NEW GUINEA. Northern part, Doormantop, 3200—3250 m, *Lam* 1596 (BO, L), 1676 (BO, L).

var. *pluriglandulosum* J. J. S., Nova Guinea 12 (5), 1917, 530; Sleum., Bot. Jahrb. 72, 1942, 258.

NEW GUINEA. Southern part, Oranje Mts, top of Mt Wichmann, 3000 m, *Pulle* 1002 (BO, lectotype; K, L, U). Crest of the Kajan Mts, 3200 m, *Pulle* (*Versteeg*) 2461.

186. *V. perrigidum* Elm., Leaf. Philip. Bot. 3, 1911, 1094; Merr., En. Philip. 3, 1923, 251; Copel. f., Philip. J. Sc. 42, 1930, 561, pl. 3, f. 1—4.

PHILIPPINES. Mindanao, Todaya (Mt Apo), 1675 m, *Elmer* 11686 (A, BM, BO, FI, GH, L, NY; PNH, type, †; US, cit. Copel. f., not seen); Davao, Mt MacKinley, *Kanehira* 2719 (NY). Agusan prov., Mt Urdaneta, *Elmer* 13281.

187. *V. retivenium* Sleum., Bot. Jahrb. 71, 1940, 164 ('*retevenium*').

BORNEO. Sarawak, Mt Kalulong (3° 14'—114° 41'), c. 1510 m, *Pickles* 3746. North Borneo, Mt Kinabalu, (1065—)2285—2440 m, *Clemens* 33711 (A; B, type, †; BM, BO, G, L, NY), 40804, 51638; *Carr* SF 26695; *KEP* 71639 *Sow*.

188. *V. angulatum* J. J. S., Nova Guinea 12 (2), 1914, 167, t. 52 B; l. c. 12 (5), 1917, 536; Sleum., Bot. Jahrb. 72, 1942, 249.

NEW GUINEA. Southern part, Northwest R., c. 2000 m, *Coenen* 41 (BO, type, preserv. in formaline, not seen). Hellwig Mts, 2600 m, *Pulle* 851; *von Römer* 1203 (BO). Ascent to Mt Carstensz via the Utakwa R., camp IVb at 1090 m, fl. 24-1-1913, *B. Kloss* s.n. (BM); *ibid.*, camp IVc at 1675 m, fl. fr. 19-2-1913, *B. Kloss* s.n. (BM, type); exact locality not given, fl. Dec. 1912, *B. Kloss* s.n. (BM).

189. *V. angiense* Kaneh. & Hatus., Bot. Mag. Tokyo 56, 1942, 480, f. 5.

NEW GUINEA. Northwestern part, Arfak Mts, Angi, Mt Koebré, 2300 m, fl., *Kanehira* & *Hatusima* 13642 (FU, type, not seen), 13718 (A, BO, paratype, fr.).

190. **V. cruentum** Sleum., nov. spec. — Frutex usque ad 3 m altus. Ramuli graciles, ad partes novellas folia nondum matura gerentes subdense pubescentes, ad partes vetustiores profunde longitudinaliter striati et glabrescentes, in sicco rubescentes, denique cito corticati, laxe usque subdense foliati. Folia oblongo-elliptica, interdum subovato-oblonga, apice breviter (0,3—0,8 cm longe) obtuse acuminata, basi latius vel angustius attenuata, interdum ovata vel ovato-elliptica, basi truncata vel rotundata, utroque latere glandula conspicua  $\pm$  prorumpente juxta petiolum instructa, coriacea, juventute rubescentia, utrinque in facie densius vel laxius pilosa, maturitate supra glabrescentia et subnitida, subtus ad costam densius et persistenter, per faciem laxius et  $\pm$  caduce pilosa, denique etiam subtus glabrescentia, ultro subtus laxe caduce glanduloso-muriculata, integra, margine ipso parum vel haud revoluta, (1,8—) 2—3 cm longa, (0,8—) 1—1,5 (—1,8) cm lata, costa supra impressa, subtus obtuse prominente, nervis lateralibus utroque latere 1—2 basalibus, ceteris 3—4 a costa orientibus, patentibus, anastomosantibus, subtus tantum cum rete venarum sat denso prominulis; petioli pubescentes, paullo applanati, 2—3 mm longi, c. 1 mm diam. Racemi ex axillis superioribus pluribus orti, subdense 6—15-flori, corolla excepta breviter subdense albido-pilosi; rhachis subgracilis, (1—) 2—3 cm longa. Pedicelli crassiusculi, (4—) 5—8 mm longi, basi bractea membranacea oblonga vel lanceolata acuta usque ad 8 mm longa et 4 mm lata citissime (numerosiores iam ante anthesin) caduca suffulti, bracteolis haud visis. Calyx cupuliformis, basi rotundatis, tubo fere 2 mm alto et 3 mm diam., lobis deltoides glandula apicali magna obtusatis, c. 1 mm longis. Corolla subcylindrico-urceolata, saturate rubra, carnosula, intus extusque glabra, (7—) 8 (—9) mm longa, inferne 3—4, superne infra lobos c. 2,5 mm diam., lobis obtusis reflexis 1 mm longis. Stamina 10, c. 4 mm longa; filamenta e basi dilatata subulata, in inferiore tertio  $\pm$  dense longepilosa, superne glabra, 2,5 (—3,5) mm longa, alternatim paullo longiora et breviora; thecae oblongae, granulatae, basi obtusae, c. 1 mm longae, ecalcaratae; tubuli cylindrici, erecti, thecis paullo angustiores, c. 0,5 mm longi, apice suboblique abscissi, pariete postico  $\pm$  distincte in dentem erectum vel reflexum extenuato. Discus glaber vel pilis paucis, interdum numerosioribus instructus. Stylus subgracilis, glaber, 7—8 mm longus. Bacca globosa, pubescens, 5—6 mm diam., pedicello fructifero vix accrescente, matura nigrescens.

NEW GUINEA. Eastern part, Eastern Highlands, near Kerigomna camp, Goroka subdistr., c. 3000 m, fl. 5-7-1956, *Hoogland & Pullen 5534* (A, BM, BO, BRI, CANB, G, K; L, type; LAE, P, PNH). Mt Wilhelm, 3260—3745 m, *Robbins 1169*; *Brass 30683*; *ibid.*, Lake Aunde, 3500 m, *Hoogland & Pullen 5645*; *N. G. F. 8931 Womersley*; *ibid.*, Lake Piunde, 3565 m, *Robbins 683*.

191. **V. alvarezii** Merr., Philip. J. Sc. 4, 1909, Bot. 304; En. Philip. 3, 1923, 247; Copel. f., Philip. J. Sc. 42, 1930, 562, pl. 3, f. 5—6. — *V. turbinatum* Merr., Philip. J. Sc. 10, 1915, Bot. 54; En. Philip. 3, 1923, 252.

var. *alvarezii*.

PHILIPPINES. Luzon, Cagayan prov., Mt Cagua, *B. S. 78373, 78376* (rhachis and pedicels puberulent!), *78438 Edano*; Dalisay R., 650 m, *F. B. 18466 Alvarez* (PNH, type of *V. alvarezii*, †); *Alvarez s.n.* (E, possibly = *F. B. 18466*); without locality *F. B. 16718 Curran* (PNH, †). Rizal prov., Montalban, *Loher 12761* (UC, cit. Copel. f., not seen); Mt Irig (Angilog), *B. S. 40743 Ramos* (P). Laguna prov., San Antonio near Paete,



*B. S. 15068 Ramos* (K; US, type of *V. turbinatum*, cit. Copel. f., not seen); *F. B. 23476 Villamil* (PNH, †); *F. B. 26820 Catalan* (A, K); *F. B. 26767 Mabesa* (US, cit. Copel. f., not seen).

var. *moisense* Copel. f., Philip. J. Sc. 42, 1930, 564.

PHILIPPINES. Luzon, Isabela prov., Mt Moises, 900 m, *B. S. 47303 Ramos & Edano* (BM, NY, P, SING; UC, type, cit. Copel. f., not seen).

192. *V. cavendishioides* Sleum., nov. spec. — Frutex c. 2 m altus, interdum usque ad 5, raro usque ad 10 m scandens. Ramuli obtusanguli, glabri, cito corticati, graciles, laxe usque subdense foliati. Folia elliptica vel lanceolato-usque oblongo-elliptica, apice breviter vel brevissime obtuse acuminata vel attenuata, vel interdum breviter subcaudato-attenuata, basi anguste vel latius in petiolum attenuata, utroque latere ad ipsam basin glandula minuta impressa instructa, subcoriacea vel tenuiter coriacea, juvenilia in vivo rosacea, matura supra saturate, subtus dilutius viridia, firma, glabra, lucidula, integra, margine angustissime cartilaginea quam lamina pallidiore et plana, 3—5,5(—7) cm longa, (1,3—)1,5—2,5(—3) cm lata, costa supra paullo impressa, subtus obtuse prominente, nervis lateralibus utroque latere basalibus et paullo suprabasalibus c. 3, superioribus subanguste parallelis altius a costa abeuntibus aequaliter alte subcurvato-ascendentibus paucis, omnibus anastomosantibus utrinque parum prominentibus, reticulatione subtus tantum prominula; petioli a dorso compressi, 3—4(—5) mm longi, c. 1 mm diam. Racemi ex axillis superioribus 4—6 orti, ascendentes vel  $\pm$  patuli, corolla glabra excepta in omnibus partibus minute papilloso-puberuli, 12—18-flori; rhachis angulata, sat gracilis, 2,5—5 cm longa., florendi tempore iam eperulata. Pedicelli graciles, 3—5(—6) mm longi, initio bractea membranacea ovata usque ovato-oblonga, ciliolata, 3—6 mm longa et 2—3 mm lata, sub anthesi caduca fulti, bracteoilis basalibus sububulato-linearibus, ciliolatis, vix 1 mm longis, citissime caducis. Calycis tubus cupulatus, basi subtruncatus, 1—1,2 mm longus, limbus subpatens, fere usque ad basin 5-partitus, lobis subovato-deltoides 0,5—0,7 mm altis, obtusiusculis, ciliolatis, interdum (vel pro parte) glandula minuta apiculatis. Corolla urceolata, apice paullo constricta, tenera, rubra vel rosea, ad lobos crenea, vel tota alba, extus intusque glabra, (4—)5 mm longa,  $\pm$  2 mm diam., lobis obtusis reflexis 0,7 mm longis. Stamina 10; filamenta subulato-lineararia, inferne dense pilosa, 2 mm longa; thecae late oblongae, ecalcaratae, 0,7—0,8 mm longae; tubuli cylindrici, thecis fere aequalati, 0,4—0,5 mm longi, apice oblique scissi, pariete postico in tubulo in dentes 1 vel 2 breves erectos extenuato. Discus prominens glaber. Stylus sat gracilis, glaber, corollam subaequans vel denique exsertus.

NEW GUINEA. Northwestern part, Vogelkop Peninsula, Kebar valley, c. 830 m, fl. 11-11-1954, *Van Royen 5014* (A, BO, CANB, K; L, type; LAE, PNH); *ibid.*, 750 m, near Andjai, *Van Royen 3939*; *ibid.*, Anomi, 720 m, *B.W. 6860 Koster*. Wehali, NE of Teminabuan, *Salverda 107, 111*; *ibid.*, near Framo, *Salverda 79*. Ajamaru, 275 m, *B.W. 4977, 4981 Versteegh*.

193. *V. irigaense* Merr., Philip. J. Sc. 10, 1915, Bot. 52; En. Philip. 3, 1923, 249; Copel. f., Philip. J. Sc. 42, 1930, 576, pl. 5, f. 3—5.

PHILIPPINES. Luzon, Camarines Sur prov., Mt Iriga, *Philip. Pl. 1549 Ramos* (BM, BO, BRI, G, GH, L, NY, P; PNH, type, †; SING). Sorsogon prov., Mt Bulusan, 870—1030 m, *B. S. 23676 Ramos*; *Elmer 16867*; *PNH 2750 Sulit*; *Sinclair & Edano 9666*; *PNH 38484, 38519 Edano & Gutierrez*. Mt Poidol, *B. S. 23361 Ramos*. Catanduanes, Mt Mariguison, *Ramos & Chan s.n.* (PNH, †). Biliran Isl., Mt Suirio, 530 m, *PNH 21513 Sulit*.

194. **V. fraternum** Sleum., nov. spec. — Arbuscula valde ramosa, 4—6 m alta, in omnibus partibus exterioribus glabra. Ramuli graciles, in sicco rubescentes, nitidi, subdense foliati. Folia anguste elliptica vel oblongo-, rarius subovato-elliptica, apice 1—1,5 cm longe (sub)caudato-acuminata, apice ipso obtusiuscula, basi  $\pm$  late in petiolum attenuata vel cuneata, paullo supra vel ad ipsam basin utroque latere glandula marginali parva instructa, coriacea, subtus laxissime vel vix visibiliter glanduloso-punctulata, integra, 3,5—6 cm longa, (1,5—)1,8—2,5 (raro usque ad 3,2) cm lata, costa supra angustissime impressa, subtus inferne late valdeque obtuse prominente, sursum cito plana vel evanescente, nervis lateralibus utroque latere 1—2 basalibus resp. paullo suprabaalibus, ceteris altius a costa abeuntibus 2—3(—4), omnibus alte curvato-ascendentibus et anastomosantibus, supra subinconspicuis, subtus minute elevatis, reticulatione sat densa subtusque tantum prominula; petioli in vivo rubri, sat graciles, a dorso parum compressi et sulcati, 3—5 mm longi,  $\pm$  1 mm crassi. Racemi in axillis superioribus 1—2(—3) recti vel subrecurvati, subdense 10—15-flori, floribus subsecundis; rhachis sat gracilis, (3—)4—6 cm longa, eperulata. Pedicelli crassiusculi, (4—)5—6(—7) mm longi, bractea anguste oblonga, acuminata, 6—10 mm longa, 2—4 mm lata anthesi partim persistente, partim iam caduca suffulti, bracteolis non visis. Calycis tubus subcampanulato-obconicus, basi attenuatus et  $\pm$  truncatus, rugulosus, nitidulus, 1,5 mm longus, limbus patens,  $\pm$  humilis, c. 0,5 mm altus, profunde 5-lobus, lobis latissime ovatis vel depresso-semiorbicularibus ciliatis, apice glandula subcrassa notatis. Corolla subcylindrico-urceolata, tenera, viridescenti-alba, utrinque glabra, c. 7 mm longa, inferne  $\pm$  2,5 mm diam., lobis ovatis denique reflexis c. 1 mm longis. Stamina 10; filamenta subulato-lineararia, ad 2/3 inferiorem partem dense longepilosa, superne glabra, c. 2,5 mm longa; thecae oblongae, ecalcaratae, 1—1,2 mm longae; tubuli thecis inferne aequilati, superne angustati, apice valde oblique scissi, 0,5—0,6 mm longi, pariete postico utriusque tubuli in dentem erectum conspicuum extenuato. Discus glaber, crassus, calycis lobos superans. Stylus graciliter columnaris, glaber, c. 6 mm longus. Bacca deest.

NEW GUINEA. Southeastern part, Milne Bay Distr., Goodenough Isl., E slopes, c. 1700 m, fl. 10-10-1953, *Brass* 24548 (A, type; L).

195. **V. claoxylon** J. J. S., Ic. Bog. 4, 1910, 71, t. 321; Merr., En. Born. 1921, 466. — *V. sp.* near *V. teysmannii*, Stapf, Trans. Linn. Soc. ser. 2 Bot. 4, 1894, 190.

BORNEO. North Borneo, Mt Kinabalu, 1370—2680(—2985) m, *Haviland* 1107, 1213; *Clemens* 10688, 27828, 27829, 28914a, 28935, 29465, 29853, 32316, 32475, 32823, 32987, 33183, 33674, 34308, 50039, 50625; *Carr* SF 26924, 27486, 27493; *Sinclair* c.s. 9052, 9093; *Smythies* 10642. Central Eastern part, W. Kutei, Mt Palimasan near Tabang on Belajan R., 700 m, *Kostermans* 12985 A. Western part, G. Samedum, *Hallier* 718 (BO, syntype; K, L); G. Kenepai, *Hallier* 1690 (BO, lectotype; L).

196. **V. halconense** Merr., Philip. J. Sc. 2, 1907, Bot. 294; l. c. 3, 1908, Bot. 377; En. Philip. 3, 1923, 249; Copel. f., Philip. J. Sc. 42, 1930, 578, pl. 5, f. 6—7.

PHILIPPINES. Luzon, Zambales prov., Mt Tapulao, B.S. 4697 *Ramos* (US, cit. Copel. f., not seen); F.B. 8101 *Curran & Merritt* (PNH, †); Mt Pinatubo, *Clemens* 17469. Bataan prov., Mt Mariveles, *Merrill* 781. Mindoro, Mt Halcon, 1350—1600 m, *Merrill* 5665 (K, NY; PNH, †; US, type, cit. Copel. f., not seen); F.B. 4422 *Merritt* (G); PNH 3348 *Edano*; Ilong Peak, 1600 m, PNH 20496 *Rabor*. Negros, Occidental prov.,

Mt Mapara, *F.B. 13626 Curran & Foxworthy* (PNH, †); Canlaon volcano, *F.B. 17392 Curran* (US, cit. Copel. f., not seen); Oriental prov., Cuernos Mts, *Elmer 9541, 9655*. Mindanao, Bukidnon prov., Tangkulan, *B.S. 26065 Fénix*; *B.S. 39122 Ramos & Edano*. Davao prov., Mt McKinley, *PNH 986 Edano*. Cotabato, Mt Matutum, 2135 m, *PNH 85057, 85073, 85086 Ramos & Edano*.

197. *V. roseiflorum* J. J. S. in Gibbs, Arfak, 1917, 173; Sleum., Bot. Jahrb. 72, 1942, 257.

NEW GUINEA. Northwestern part, Arfak Mts, Angi Lakes, 2135 m, *Gibbs 5586* (BM; BO, type; K).

Note: The material cited from the same place by Kanehira & Hatusima (Bot. Mag. Tokyo 56, 1942, 482, *K. & H. 13719*, fr., BO) is similar in foliage, has quite glabrous inflorescences, longer pedicels, and the calyx lobes with a distinct apical gland; perhaps a new species, but material too poor for description.

198. *V. leptocladum* Sleum., nov. spec. — Fruticulus gracillimus epiphyticus, ramulis novellis tenerrimis vix 1 mm diam., angulatis patenterque puberulis, vetustioribus glabrescentibus vix 2 mm diam., laxe usque subdense foliatis. Folia anguste oblonga vel plerumque obovato-oblonga, apice obtusa vel rotundata, basi in petiolum cuneata, subcoriacea, glabra, glandulis marginalibus nullis, integra, ad ipsam marginem minute revoluta, (7—)8—10 mm longa, 2,5—3 mm lata, nervis utroque latere 2—3 e basi et parum supra basin ortis, alte ascendentibus, cum costa utrinque prominulis, reticulatione subdensa utrinque parum elevata; petioli graciles, c. 1 mm longi. Racemi reducti 2-flori (pedunculo gracili 3—5 mm longo, pedicellis gracilibus glabris 4—6 mm longis) vel flores solitarii (pedunculo 2—3 mm longo, pedicello 5—7 mm longo), bracteis bracteolisque haud visis. Calyx extus ubique subdense pilosus, tubo late campanulato 0,5 mm longo, limbo suberecto profunde 5-lobato, lobis deltoideis c. 1 mm longis, subobtusis, margine ciliatis glandulisque nonnullis crassiusculis subsessilibus ornatis. Corolla ovoideo-urceolata, inferne ventricosa, fauce abrupte contracta, 3,5—4 mm longa, inferne c. 2,5 mm diam., extus glabra, intus ad  $\frac{1}{4}$  infer. partem puberula, rubra, lobis vix 1 mm longis. Stamina 10, subaequalia; filamenta lineari-subulata, villosa, 1,5 mm longa; thecae late oblongae, ecalcaratae, cum tubulis brevissimis thecis aequilatis apice suboblique truncatis 0,8 mm longae. Discus laxe pilosus. Stylus filiformis, ad dimidiam infer. partem pilosus, c. 4 mm longus. Bacca haud visa.

BORNEO. Southeastern part, W. Kutei, Mt Kemul, 1600 m, fl. 16-10-1925, *Endert 4220* (A, BO, K; L, type; SING).

199. *V. phillyreoides* Sleum., Bot. Jahrb. 71, 1940, 163. — *V. sp.* near *V. varingiaefolium*, Stapf, Trans. Linn. Soc. ser. 2 Bot. 4, 1894, 189.

BORNEO. Sarawak, Mt Mattang, *Beccari P.B. 2047*. Mt Dulit, Ulu Koyan, near Long Kapa, 950 m, *Richards 2510* (A; K, type; L, SING). North Borneo, Mt Kinabalu, 915—1525 m, *Haviland 1324, 1844*; *Clemens 28806, 30627, 31580, 32088, 40642, 40740, 40850*. Central part, Liang-gagang, *Hallier 3062*. Southeastern part, W. Kutei, Mt Kemul, 1500 m, *Endert 3885*.

200. *V. amplexicaule* J. J. S., Bull. Jard. Bot. Btzig II, 8, 1912, 52; Nova Guinea 12 (2), 1914, 159, t. 45 C; Sleum., Bot. Jahrb. 72, 1942, 263.

NEW GUINEA. Southern part, Oranje Mts, Mt Goliath, 3200 m, *De Kock 91* (BO, type, pres. in formaline, not seen).



201. *V. hooglandii* Sleum., nov. spec. — Arbuscula vel frutex, haud raro epiphyticus, filamentis villosis exceptis omnino glaber. Ramuli angulati, cito cinereo-corticati, in sicco striati, inferne dense, apicem versus subimbricato-foliati. Folia ovata, apice breviter obtuse acuminata vel attenuata, basi profunde cordata et auriculata, lobis rotundatis ramulos  $\pm$  amplectentibus, juvenilia rubra et glaucescenti-suffusa, matura viridia, coriacea, integra, inferiora maiora, 5—8(—9) cm longa, 3—5(—6) cm lata, superiora gradatim minora, summa 2,5 cm longa et 1,5—2 cm lata, margine vix revoluta, costa supra plana vel levissime immersa, subtus prominente, nervis utroque latere 7—8, basalibus 3—4, ceteris altius a costa abeuntibus, omnibus anastomosantibus, supra subimpressis, subtus prominulis, rete venarum venularumque denso, subtus tantum prominulo; petioli (1—)2—3 mm longi, 1,5—2 mm crassi. Racemi abbreviati vel ad fasciculos fere reducti, plerumque coarctati, rarius laxiores, ex axillis summis orti, 5—10(—12)-flori; rhachis c. 1 cm longa. Pedicelli sat robusti, curvati, 0,8—1,3 cm longi, basi bractea lanceolata apice ciliata c. 6 mm longa et 2 mm lata citissime caduca instructi, bracteolis haud visis. Calyx late campanulatus, tubo 1,5—2 mm longo, limbo patenti crasse carnosus usque ad basin 5-partito, lobis late deltoideis apice obtusatis ibique interdum ciliatis, basi 2,5 mm latis, 1,5—2 mm longis. Corolla subgloboso-urceolata, infra lobos paullo contracta, carnosa, c. 5 mm longa, 4 mm diam., extus glabra, intus in superiore parte pilosa, rosea, lobis obtusis subreflexis 1 mm longis. Stamina 10; filamenta linearia, antice villosa, dorso glabra, c. 1 mm longa; thecae oblongae, cum tubulis c. 1,5 mm longae, ecalcaratae, tubulis ipsis thecis aequilatis brevissimis oblique scissis, obturatione vel glandula inter thecas sita instructae. Discus annularis glaber. Stylus columnaris, glaber, 3,5 mm longus. Bacca globosa, apice truncata discoque crasso coronata, c. 6 mm diam., maturitate nigrescens.

NEW GUINEA. Eastern part, Western Highlands, near Wankl village, c. 5 km SE of Mt Hagen, c. 2150 m, fl. 11-8-1956, *Hoogland & Pullen 5862* (A, BM, BRI, CANB; L. type; LAE; US, not seen). Mt Kum, near Mt Hagen, 1980 m, *N. G. F. 9480 Womersley*; Upper Kum R., near Wankl, 2195 m, *Robbins 38*.

202. *V. stellae-montis* Sleum., nov. spec. — Frutex parvus, usque ad 30 cm altus. Rami partim horizontales et radicales, partim erecti, inferne defoliati, teretes, 2—3 mm diam.; ramuli graciles, pulvinibus foliorum decurrentibus obtusanguli, laxe breviter pilosi, dense foliati. Folia elliptica, rarius oblongo-elliptica, apice rotundata et per 0,5—1 mm profunde retusa, basi late attenuata vel subrotundata, ipsa basi utroque latere glandula minuta marginali instructa, coriacea, costa supra inferne laxe pilosa excepta glabra, subtus laxissime glanduloso-punctata, supra lucida, integra, anguste marginata, 1,5—2,3 cm longa, (0,8—)1—1,5 cm lata, costa supra leviter vel vix impressa, subtus parum prominente, nervis lateralibus 2—3-paribus, infimis 2 e basi alte ascendentibus, ceteris (haud semper obviis) altius a costa abeuntibus, omnibus supra levissime vel haud impressis, subtus prominulis, venis venulisque generaliter parum conspicuis; petioli subteretes, pilosi, sat graciles, 3—4(—5) mm longi, 0,5—1 mm diam. Racemi ex axillis superioribus 2 vel 3 orti, nutantes, (2—)3(—4)-flori, in omnibus partibus exterioribus glabri; rhachis gracilis, (0,5—)1—1,5 cm longa, basi perulis paucis reductis circumdata. Pedicelli crassitudine rhachis, 0,8—1,1 cm longi, basi bractea 1 (rarius 2) subuliformi 1—1,5 mm longa citissime caduca suffulti. Calycis tubus turbinatus, rugulosus, ruber, 1,5—2 mm longus, limbus patens, c. 1 mm altus, fere usque ad basin

5-lobus, lobis late deltoideis valde obtusis glandula apicali carentibus, ciliolatis. Corolla late urceolata vel fere subgloboso-urceolata, ad tubum saturate rosea, intus ad lobos albida, carnosula, extus glabra, intus ubique pilosa, bene evoluta 0,8—1 (—1,2) cm longa, inferne c. 0,8 cm diam., superne infra lobos ad 3—4 mm diam. contracta, lobis suberectis obtusis c. 1,5 mm longis. Stamina 10; filamenta anguste linearia, basi paullo dilatata, inferne subdense, superne laxius pilosa, infra thecas glabra, c. 4,5 mm longa; thecae oblongae, echinulatae, curvatae, ecalcaratae, 1,5 mm longae; tubuli thecis aequilati, brevissimi vix 0,5 mm longi, apice oblique scissi, quasi mutici. Discus glaber. Stylus columnaris, glaber, 6 mm longus. Bacca haud visa.

NEW GUINEA. Central part, Star Mts, Mt Antares, 3300 m, fl. 25-7-1959, *Kalkman 4514* (L, type).

203. *V. lageniforme* J. J. S., Bull. Jard. Bot. Btzg II, 8, 1912, 53; Nova Guinea 12 (2), 1914, 158, t. 45 B; Sleum., Bot. Jahrb. 72, 1942, 249.

NEW GUINEA. Southern part, Oranje Mts, Mt Goliath, 150 m, *De Kock 174* (BO, type, pres. in formaline, not seen).

204. *V. crassistylum* Sleum., nov. spec. — Frutex parvus, scandens, vel arbuscula. Ramuli graciles, pendentes, glaberrimi, laxe foliati. Folia ovata usque lanceolato-ovata, apice 1—2 cm longe (sub)caudato-acuminata, subacuta, basi late attenuata usque rotundata, sed basi ipsa brevissime in petiolum contracta, glandula sat magna marginali suprabasali glandulisque marginalibus ceteris nonnullis minus distinctis remotis usque ad laminae apicem dispositis instructa, coriacea, glabra,  $\pm$  lucidula, margine angustissime cartilaginea, primo visu integra, re vera distanter subcrenulata, (3—)3,5—6,5 (—8) cm longa, (1,5—)2—3 cm lata, costa supra leviter immersa, subtus prominente, nervis basalibus utroque latere 2, ceteris altius a costa abeuntibus 1—2, cum basalibus alte curvato-ascendentibus et anastomosantibus, summis brevioribus (seu venis)  $\pm$  pinnatis paucis, omnibus supra levissime insculptis vel subobscuris, subtus paullo elevatis, reticulatione sat densa subtus tantum prominula, interdum et hic parum distincta; petioli 3—4 mm longi, c. 1 mm crassi. Racemi ex axillis superioribus 2—5 orti, laxe 3—5 (—7)-flori, omnino glabri, breviter pedunculati; rhachis gracillima, 1—1,5 (—2) cm longa, eperulata. Pedicelli filiformes, sub anthesi 1,5 (—1,8), sub fructu c. 2 cm longi, interdum basi bracteola aciculari fulti. Calyx late cupularis, tubo c. 1,5 mm longo, limbo recto, 0,6—1 mm alto, fere usque ad basin 5-sinuato vel -dentato vel -denticulato. Corolla subglobosa, apice breviter 5-loba, carnosula, alba vel viridescens, extus intusque glabra, c. 4 mm longa, 4—5 mm diam. Stamina 10, 2,8—3 mm longa; filamenta late subulato-linearia, dense pilosula, 1,5 mm longa; thecae ovato-oblongae, 1 mm longae, ecalcaratae; tubuli thecis paullo angustiores, cylindrici, 0,6 mm longi, poro obliquo hiantes. Discus glaber. Stylus crasse columnaris, glaber, 3 mm longus. Bacca submatura depresso-globosa, saturate rubra, disco crasso coronata, c. 4 mm diam.

NEW GUINEA. Eastern part, Western Highlands, Al River, Nondugl, 1600 m, *N. G. F. 5166 Womersley* (A, BM, BO, CANB, K; L, type; LAE), fl. 5-9-1953; Minj R. valley, 2590 m, *Robbins 1151*. Eastern Highlands, Kortumi S. D. A. Mill via Goroka, 2135 m, *N. G. F. 6757 Floyd & Womersley*. Mt Otto, S slope, 2000 m, *Brass 31084*.

205. *V. brevipedunculatum* J. J. S., Nova Guinea 18, 1936, 119, t. 32; Sleum., Bot. Jahrb. 72, 1942, 252.

NEW GUINEA. Northern part, Doormantop, 1800—2000 m, *Lam 1918* (BO, type; L), 1973. Bernhard camp, Idenburg R., 900 m, *Brass 13701*.

206. *V. longepedicellatum* Sleum., nom. nov. — *V. ardisioides* Wernh., Trans. Linn. Soc. ser. 2 Bot. 9, 1916, 90; Sleum., Bot. Jahrb. 72, 1942, 252, non Ridl. (1914).

NEW GUINEA. Southern part, ascent to Mt Carstensz from Utaqua R., 2530—3350 m, *B. Kloss s.n.* (BM, type).

207. *V. retusifolium* J. J. S. in Fedde, Rep. 30, 1932, 176.

MOLUCCAS. Ceram, Central part, G. Pinaia, 2750—3000 m, *Stresemann 307* (BO; L, type); G. Murkele, 2000—2500 m, *Rutten (Kornasi) 1489*. Buru, G. Fogha, 1700—2050 m, *Stresemann 388*; Fakal, summit of Fat 'Koton, 1475 m, *Toxopeus n. Bk.*

208. *V. brassii* Sleum., Bot. Jahrb. 72, 1942, 251.

var. *brassii*.

NEW GUINEA. Southeastern part, Centr. Distr., Murray Pass, Wharton Range, 2840 m, *Brass 4538, 4606, 4695* (A, BO, L; NY, type, † in B). Mt Albert-Edward, c. 4000 m, *Brass 4170* (NY, † in B).

var. *madarum* Sleum., Bot. Jahrb. 72, 1942, 252.

NEW GUINEA. Southeastern part, Centr. Distr., Murray Pass, Wharton Range, 2840 m, *Brass 4548* (L, MEL; NY, type, † in B).

209. *V. leptomorphum* Sleum., nov. spec. — Frutex debilis, epiphyticus, ramis c. 1 m longis, ramulis gracilibus subteretibus, in partibus juvenilibus patenter brevissime pubescentibus, in partibus vetustioribus glabris, laxius vel densius foliatis. Folia ovata, apice per 0,5—1 cm subcaudato-acuminata, apice ipso obtusa, basi late attenuata usque subrotundata, glandula marginali parva utroque latere a petiolo 1—2 mm remota instructa, subcoriacea, glabra, sed subtus laxissime punctata, nitidula, 2,5—3,5 cm longa, (0,7—)0,9—1,4 cm lata, integra, margine imprimis in inferiore laminae dimidia parte distincte revoluta, costa supra impressa, subtus parum prominente, nervis utroque latere basalibus et parum suprabasalibus 1—2 alte curvato-ascendentibus, superioribus brevioribus (seu venis) ± pinnatis paucis, omnibus supra subinconspicuis, subtus cum reticulatione subdensa prominulis; petioli puberuli, (2—)3—4 mm longi, 0,5 mm crassi. Racemi ex axillis summis 1 vel 2 orti, laxi 2—3-flori; rhachis laxissime pilosa, gracilis, 0,5—1 cm longa, eperulata. Pedicelli graciles, sub anthesi 1,2—1,5 cm longi, ad apicem laxi pilosuli ceterum glabri, ebracteati et ebracteolati. Calyx inferne ad tubum laxi, ad limbum sparsius pilosulus, tubo campanulato 1,5 mm longo, limbo subpatenti fere usque ad basin 5-lobi, 1,5 mm alto, lobis deltoideis subobtusis ciliatis, glandula apicali carentibus. Corolla tubuloso-urceolata, apicem versus attenuata, albo-rosea, tenera, extus glabra, intus in tertio inferiore laxi pilosa, 9—10 mm longa. c. 3 mm diam., lobis ovatis reflexis c. 1 mm longis. Stamina 8; filamenta subulato-linearia, subdense patenter pilosa, 2,5 mm longa; thecae ovato-oblongae, ecalcaratae, 0,8 mm longae; tubuli c. 0,3 mm longi quam thecae aequilati, interdum glandula sessili minuta ornati, apice oblique truncati, pariete postico in dentem brevissimum reflexum extenuato. Discus laxi pubescens. Stylus columnaris, 7,5 mm longus, ad  $\frac{3}{4}$  partem inferiorem laxi patenter pilosus, superne papillosus. Bacca immatura globosa, laxi pubescens, c. 3 mm diam., pedicello fructifero c. 1,5 cm longo.

NEW GUINEA. Southeastern part, Milne Bay Distr., Goodenough Isl., E slopes, 1600 m, *Brass 24750* (A; L, type), fl. fr. 16-10-1953.



210. *V. capillatum* Sleum., nov. spec. — *V. minuticalcaratum* J. J. S. f. *capillatum* Sleum., Bot. Jahrb. 72, 1942, 254. — Arbuscula 3—8(—16) m alta. Ramuli sat graciles, angulati, glaberrimi, laxe usque subdense foliati. Folia elliptica vel oblongo-elliptica, apice per 1—2 cm subcaudato-acuminata, subacuta, basi in petiolum attenuata vel subcuneata, utroque latere glandula marginali juxta petiolum, interdum altera altiore paullo distante instructa, coriacea, glabra, subtus laxe glanduloso-punctata, imprimis subtus lucidula, integra, (4—)5—10 cm longa, (2—)2,2—3 cm lata, plana vel in ipso margine minute revoluta, costa supra anguste impressa, subtus prominente, nervis utroque latere basalibus et parum suprabasalibus 2—3, ceteris altioribus brevioribus similiter curvato-ascendentibus 1—2, summis brevissimis et  $\pm$  patentibus paucis, omnibus anastomosantibus et cum reticulatione densa supra minute vel leviter, subtus distinctius elevatis; petioli (4—)5—7 mm longi, c. 1 mm crassi. Racemi ex axillis summis 1—2 solitarii, suberecti, sat dense (5—)8—15-flori; rhachis sat robusta, sicut pedicelli glabra, (2—)2,5—5 cm longa, florendi tempore eperulata. Pedicelli crassiusculi, 9—12 mm longi, ebracteati et ebracteolati. Calyx subdense breviter pubescens, tubo campanulato 1,2 mm longo, limbo subpatenti 1,5 mm alto, fere usque ad basin 5-lobo, lobis deltoideis subacutis ciliatis, glandula apicali carentibus. Corolla tubuloso-urceolata, sat tenera, extus glabra, intus in inferiore dimidia parte laxe pilosula, alba, c. 9 mm longa, 3—4 diam., lobis angusta ovatis obtusis reflexis 1 mm longis. Stamina 10, 5—5,5 mm longa; filamenta lineari-subulata, subdense pilosa, 2,8—3 mm longa; thecae oblongae, 1,5 mm longae, dorso brevissime bicalcaratae; tubuli thecis paullo angustiores, 0,8 mm longi, eglanduliferi, apice suboblique scissi, pariete postico in dentem brevem suberectum protracto. Discus ad marginem interiorem sat dense pubescens. Stylus subgracilis, c. 8 mm longus, ad  $\frac{3}{4}$  inferiorem partem subpatenter pilosus. Fructus immaturus subglobosus, basi apiceque truncatus, in vertice pubescens, c. 4 mm diam.

NEW GUINEA. Northern part, S slopes of Balim R. valley, 2000 m, *Brass 11605* (A; L, type of *V. capillatum* and *V. minuticalcaratum* f. *capillatum*), fl. Dec. 1938, on poor sandy soil; 9 km NE of Lake Habbema, 2800—2850 m camp, *Brass & Versteegh 10458*, fr.; Lake Habbema, 3225 m camp, *Brass & Meijer Drees 10442*, fr. imm.

211. *V. reticulato-venosum* Sleum., nov. spec. — Frutex, interdum scandens. Ramuli graciles, inferne teretes, apicibus angulati, papilloso-puberuli, laxe foliati; gemmae axillares ovoideo-subulatae, minutae. Folia ovata usque elliptico-, rarius sublanceolata-ovata, apice sat abrupte et 1,5—2 cm longe caudato-acuminata, subacuta, basi late attenuata usque rotundata, utroque latere in inferiore laminae quarto glandulis marginalibus 2 (raro 3) minutis a petiolo remotis resp. inter sese paullo distantibus instructa, subcoriacea, flexilia, glabra vel subtus ad costam laxissime papilloso-puberula, ceterum in facie subtus laxissime punctata, integra, ad ipsam marginem parum revoluta, 4—7(—8, rarius usque ad 10) cm longa, 2—3(—3,5) cm lata, costa supra leviter immersa, subtus prominente, nervis utroque latere basalibus et paullo suprabasalibus alte curvato-ascendentibus 2—3, ceteris superioribus a costa curvato-abeuntibus brevioribus 1—2, summis subrectis (vel venis) paucis, omnibus distincte anastomosantibus utrinque cum reticulo venarum venularumque densa parum sed distincte elevatis; petioli transverse rugosi, supra canaliculati, initio puberuli, sat graciles, 2—3(—4) mm longi. Racemi ex axillis superioribus paucis ramulorum lateralium orti, laxe 5—8-flori; rhachis gracilis, (2—)2,5—4 cm longa,

basi perulis nonnullis ovato-acuminatis c. 2 mm longis ornata, sicut pedicelli brevissime patentiter-puberula. Pedicelli graciles, 1—1,5 cm longi, infra calycem muriculis paucis instructi, bractea oblonga c. 3 mm longa, sub anthesi normaliter iam caduca fulti, bracteolis 2 in superiore media vel tertia pedicelli parte instructis, oblongo-acuminatis, inter sese aliquot remotis, c. 2 mm longis, 1 mm latis, haud raro diutius persistentibus. Calycis tubus campanulatus, sparse muriculatus, 1,3—1,5 mm longus, limbus subpatens, 1,5—2 mm altus, fere usque ad basin 5-lobus, lobis ovato-delloideis dorso subcarinatis apiceque paullo incrassatis glabris, ciliatis, glandula propria carentibus. Corolla tubuloso-urceolata, superne sensim attenuata, tenera, extus glabra, intus in inferiore tertio laxe pilosa, 10(—11) mm longa, inferne 3 mm diam., laete rubra, lobis ovatis reflexis 1 mm longis. Stamina 10; filamenta subulata, inferne dense pilosa, superne sensim glabrescentia, 2,5 mm longa; thecae oblongae, ecalcaratae, c. 1 mm longae; tubuli quam thecae aequilati, vix 0,3 mm longi, apice transverse abscissi. Discus subdense pubescens. Stylus omnino dense subadpresse albopilosus, c. 9 mm longus. Bacca haud visa.

NEW GUINEA. Northeastern part, Morobe Distr., near Skindeway, Wau-Salamaua road, c. 1645 m, *N. G. F. 8381 Womersley & Millar* (A, BM, CANB, K; L, type; LAE, SING), fl. 6-1-1956. Southern part, Milne Bay Distr., N slopes of Mt Dayman, Maneau Range, 2000 m, *Brass 22949*.

Note: Leaves similar to those of *V. viridiflorum* J. J. S. (also hairs found on the midrib), but flowers completely different.

212. *V. tomicipes* J. J. S., Bot. Jahrb. 68, 1937, 212.

CELEBES. Central part, B. Pokapindjang, 2500 m, *Kjellberg 1453* (BO, type); ibid., Pintealön, 2400—2600 m, *Eyma 528 p.p.* G. Batu Toding, *Rachmat 912* (BO).

213. *V. apiculatum* Sleum., nov. spec. — Frutex. Ramuli angulati, sat robusti, rigidi, suberecti, omnino glabri, dense foliati, cito corticati. Folia elliptica vel oblongo-elliptica, apice breviter acuminata, apice ipso glandula minuta instructa et quasi subcuspidato-apiculata, basi in petiolum attenuata vel cuneata, utroque latere glandula marginali conspicua impressa ad petiolum vel 1—2 mm a petiolo distante, rarius et glandula altera paullo remota ornata, coriacea, glabra, inferne integra, in superiore laminae tertio minute sed bene visibiliter glandulis parvulis pluribus vel numerosioribus crenulata, (2—)2,2—3 cm longa, 1—1,5 cm lata, costa supra inferne leviter impressa, superne  $\pm$  plana, subtus plerumque distincte prominente, nervis utroque latere 1—2 basalibus et 1—2 suprabasalibus, resp. altius a costa orientibus atque subcurvato-ascendentibus et anastomosantibus supra vix, subtus  $\pm$  prominulis, venis laxe reticulatis, plerumque subtus tantum parum elevatis; petioli paullo applanati, sat crassi, 1—2 (rarius usque ad 3) mm longi, c. 1 mm diam. Racemi ex axillis summis 1 vel 2(—3) orti, erecti, dense 8—12-flori, floribus in sicco  $\pm$  glauco-pruinosis; rhachis crassa, angulata, glabra, 1,5—2,5 cm longa, sub anthesi eperulata. Pedicelli rigidiusculi, curvati, glabri, 2—4 mm longi, bractea basali oblonga, acuminata, usque ad 7 mm longa et 3 mm lata cito caduca fulti; bracteolae subulatae basales 2 citissime caducae. Calyx coriaceus, tubo campanulato, glabro, 1,5 mm longo, limbo erecto fere ad basin 5-partito, lobis ovato-triangularibus 1—1,5 mm longis, ciliatis, glandula apicali carentibus. Corolla urceolata, leviter 5-angulata, carnosula, extus intusque glabra, colore ignota, c. 7 mm

longa, inferne 3 mm diam., lobis obtusis reflexis c. 1 mm longis. Stamina 10; filamenta subulato-lineararia, inferne dense, superne laxius pilosa, c. 2 mm longa; thecae oblongae, ecalcaratae, 1 mm longae; tubuli cylindrici, quam thecae multo angustiores, aliquot divergentes et curvati, fere 1 mm longi, apice oblique scissi. Discus glaber. Stylus columnaris, glaber, 5 mm. Bacca immatura subglobosa, c. 4 mm diam.

NEW GUINEA. Eastern part, Western Highlands, Mt Hagen, upper forest limit, c. 3350 m, *Robbins 296* (CANB, type; L, fragm.; LAE), fl. 8-7-1957; *ibid.*, W slopes of Hagen Range, alpine grassland, 3500 m, *F. Shaw Mayer s.n.* (BM).

214. *V. sclerophyllum* Sleum., nov. spec. — Frutex parvus, dense ramosus. Ramuli graciles, angulati, patenter puberuli, internodiis approximatis, foliis dense dispositis. Folia anguste oblongo-ovovata, rarius obovata, apice obtusa plerumque brevissime retusa, basi in petiolum cuneata, utroque latere glandulis 1 (vel 2) marginalibus minutis impressis a petiolo (interque sese) valde remotis instructa, coriacea, rigida, in sicco supra convexa pallideque olivacea, subtus atrescenti-brunnea, integra, margine valde revoluta, (1,2—)1,3—1,8(—2,5) cm longa, in statu sicco partim revoluta 0,5—0,8 (rarius usque ad 1,1) cm lata, glabra, subtus sparse glanduloso-muriculata, costa supra imprimis inferne leviter impressa, subtus per totam longitudinem obtuse prominente et discolore, nervis utroque latere 1 basalibus et 2—3 superioribus pinnatis, arcuato-ascendentibus, anastomosantibus, supra levissime, subtus leviter elevatis, interdum subinconspicuis, venis laxe reticulatis utrinque vel saepius subtus tantum visibilibus; petioli subteretes,  $\pm$  2 mm longi, 0,7 mm diam., pulvinulo crasso insidentes. Racemi ex axillis summis 1 (vel 2) orti, abbreviati, extus omnino glabri, (3—)4—6-flori; rhachis subgracilis,  $\pm$  1 cm longa, eperulata. Pedicelli graciles, pendentes vel retroflexi,  $\pm$  6 mm longi. Calycis tubus cupulatus, basi rotundatus, 1,5—2 mm longus, limbus erecto-patens, profunde 5-lobus, lobis deltoideis 1—1,5 mm longis, obtusiusculis, superne ciliatis vel apice tantum penicillatis, glandula apicali nulla. Corolla tubulosa, carnosula,  $\pm$  2 cm longa, 3(—4) mm diam., levissime 5-angulata, sanguinea, utrinque glabra, lobis deltoideis obtusis c. 2 mm longis. Stamina 10; filamenta filiformia, dense pilosa, alternatim 4 et 5 mm longa; thecae subquadratae, ecalcaratae, 1 mm longae; tubuli brevissimi, thecis aequilati, 0,3 mm longi, suboblique truncati. Discus subdense breviter albopubescens. Stylus filiformis, glaber, c. 2 cm longus. Bacca haud visa.

CELEBES. Central Eastern part, Subdiv. Poso, G. Lumut, 'pilaartop en W bijtop', c. 2200 m, fl. 5-9-1938, *Eyma 3623* (A, BO, K; L, type).

215. *V. ligustrifolium* J. J. S. in Gibbs, Arfak, 1917, 174; Sleum., Bot. Jahrb. 72, 1942, 252.

NEW GUINEA. Northwestern part, Arfak Mts, Angi Lake, 2135 m, *Gibbs 5544* (BM, type).

216. *V. bartlettii* Merr., Pap. Mich. Ac. Sc. 19, 1933, 183. — *V. lucidum* (Bl.) Miq. var. *pumilum* J. J. S., Med. Rijksherb. 9, 1916, 30.

SUMATRA. Atjeh, Pang-mog, 2200 m, *Fairchild 125*. Top G. Lembuh, 3000 m, *Van Steenis 9075*; near Lau Alas R., 1800—2500 m, *Van Steenis 8712*; Lau Alas R. to Blangkedjeren, 2000 m, *Van Steenis 8752*. Putjuk Angasan, 1350—1500 m, *Van Steenis 8309*. G. Kemiri, 2900 m, *Van Steenis 9572*. G. Losir, 3000 m, *Van Steenis 8566*. East coast, Pangulubao, 2000 m, *Frey-Wyssling 49*. Tapanuli, summit Dolok Surungan,



Habinsaran, *Bartlett* 8005 (K, L, NY, type of *V. bartlettii*). Westcoast, Mt Singalang, 2000—2500 m, *Beccari* P. S. 77 (FI, K, L, lectotype of *V. lucidum* var. *pumilum*), 138; *Meijer* 5223, 5858; *Schiffner* 2352. G. Sago, 1800—2000 m, *Jacobs* 4676; *Meijer* 3589. G. Kerintji, 2000 m, *Meijer* 6464.

217. *V. pilosilobum* J. J. S., Bot. Jahrb. 68, 1937, 213.

CELEBES. Central part, B. Pokapindjang, 2500 m, *Kjellberg* 3919 (BO?, type, not seen); *ibid.*, Pokapindjang-Tinábang, 2800—3000 m, *Eyma* 636; Angin-Angin to Pintealon, 1550—2600 m, *Eyma* 513.

218. *V. acrobacteatum* K. Schum. in K. Schum. & Lauterb., Nachtr. 1905, 339; Schltr. Bot. Jahrb. 55, 1918, 175. — *V. torricellense* Schltr. l. c.; Sleum., l. c. 72, 1942, 249. — *V. tiariforme* J. J. S., Nova Guinea 18, 1936, 115. — *V. lageniforme* (non J. J. S.) Kaneh. & Hatus., Bot. Mag. Tokyo 56, 1942, 481.

NEW GUINEA. Northern part, Geelvink Bay, Dalman, 45 km inward of Nabire, 500 m, *Kanehira* & *Hatusima* 12233, 12234 (*V. lageniforme*). Wissel Lakes, Bubeiro, 1750—1800 m, *Eyma* 4869 (ster., det. not certain). Doorman R., 200 m, *Lam* 1388 (BO, type of *V. tiariforme*; L). Rouffaer R., confluent C, 250 m, *Docters van Leeuwen* 10348 (fl. too young, det. not certain). Bernhard bivouac, Idenburg R., *Meijer Drees* 574 (BO). Northeastern part, Torricelli Mts, 600 m, *Schlechter* 14504 (B, type of *V. acrobacteatum*, †); *ibid.*, 800 m, *Schlechter* 20322 (partly distrib. sub 20335, B, type of *V. torricellense*; G, K, NY, P); Morobe Distr., Sattelberg vicinity, Yunzaing, 1830 m, *Clemens* 3355a (B, †), 3732 (B, †); *ibid.*, Yoangen, 1625—1830 m, *Clemens* 3401 (cit. '3410', A); Ogeramnang, 1830 m, *Clemens* 4690 (A), 6360 (B, †); Samanzing, 1830 m, *Clemens* 8855 (B, †), 8883 (B, †), 9151 (A, B), 9163 (B); Matap, 1525—1830 m, *Clemens* 11133 bis, 40987, 41001. Kaindi, (= Wau), 2060 m, *Brass* 29613. Eastern Highlands, Daulo camp, Asaro-Mairi div., 2400 m, *Hoogland* & *Pullen* 5423 (CANB).

219. *V. nitens* Sleum., nov. spec. — Arbor parva, 6—7 m alta, trunco 15 cm diam. Ramuli sat robusti, in partibus recentissimis sparse glandulis clavatis obsiti, ceterum glabri, in partibus vetustioribus longitudinaliter striati citoque corticati, laxe usque subdense foliati; gemmae axillares subglobosae. Folia obovato-elliptica, apice late attenuata, apice ipso 3—5 mm longe obtuse subacuminato-contracta, interdum subrotundata, basi in petiolum cuneata resp. parum decurrentia, utroque latere glandula marginali sat parva a petiolo distante disposita, tenuiter coriacea, nitentia, subtus laxe glanduloso-muriculata, ceterum glabra, integra, margine ipso parum revoluta (4—)5—7 cm longa, 2,5—4 cm lata, costa supra inferne parum impressa, superne applanata vel prominula, subtus inferne petioli crassitudine, convexa et prominente, superne sensim diminuta, nervis utroque latere 2—3-basalibus vel paullo suprabasalibus, superioribus subparallelis brevioribus (2—)3—4, omnibus ascendentibus inferneque subrectis, superne curvatis et anastomosantibus, utrinque parum elevatis, reticulatione subdensa supra parum, subtus distinctius prominula; petioli applanati, supra sulcati, transverse rugulosi, 2—5 mm longi, 1—2 mm lati. Racemi ex axillis superioribus et inferioribus jam pro parte defoliatis orti, patuli, laxe multiflori, subsecundi; rhachis crassiuscula, angulata, sicut pedicelli et calycis tubus laxe vel plerumque subdense pilis glanduliferis vel glandulis clavatis gracillimis brunneis induta, epilosa, 5—8 cm longa, eperulata. Pedicelli sat graciles, 5—6(—7) mm longi, bracteis haud visis, bracteolis subulatis (2 mm) basalibus citissime caducis. Calycis tubus late campanulatus, 1 mm longus, limbus subpatens, profunde 5-lobus, lobis deltoideis dorso glabris, apice ciliolatis, glandula apicali nulla. Corolla tubuloso-urceolata, tenera, alba, fragrans,

utrinque glabra, (6—)7 mm longa,  $\pm$  2,5 mm diam., lobis reflexis obtusis vix 1 mm longis. Stamina 10, alternatim 3,5 et 4 mm longa; filamenta subulata, superne filiformia, ad basin dilatata tantum parcepilosa, ceterum glabra, alternatim 2,5 et 2 mm longa; thecae late oblongae, 0,5—0,6 mm longae, ecalcaratae; tubuli cylindrici, graciles, parum divergentes, 1 mm longi, apice oblique scissi. Discus glaber. Stylus columnaris, glaber, 6 mm longus. Bacca haud visa.

PHILIPPINES. Mindoro, Mt Yagaw, E slope, 760 m, PNH 17677 Sulit & Conklin (BM, K; L, type).

Note: Much related to *V. viscifolium* K. & G.

220. *V. jagori* Warb. in Perk., Fragm. Fl. Philip. 1905, 174; Merr., Philip. J. Sc. 1, 1906, Suppl. 112; l. c. 3, 1908, Bot. 377; En. Philip. 3, 1923, 250; Copel. f., Philip. J. Sc. 42, 1930, 592, pl. 6, f. 4—5. — *V. angustilimum* Merr., Philip. J. Sc. 12, 1917, Bot. 294; En. Philip. 3, 1923, 248.

PHILIPPINES. Luzon, Camarines Sur prov., Mt Isarog, PNH 2837 Convocar. Bataan prov., Mt Mariveles, 1160 m, Williams 746 (NY); Whitford 145, 1101; Elmer 7026; F. B. 2623 Meyer (PNH, †); Merrill 3955 (PNH, †); Merrill Decades 282; B. S. 1654 Foxworthy (PNH, †); B. S. 1655 Foxworthy (PNH, †). Rizal prov., Loher 6273 (K), 15032 (PNH, †), 15097 (PNH, †), 15100 (A; UC, cit. Copel. f., not seen); Montalban, Loher 12052 (PNH, †), 12303 (BO), 12209; Angilog, Loher 7256 (K); Mt Irig, B. S. 41958 Ramos. Tayabas prov., near Infanta, Mt Binuang, B. S. 9364 Robinson; Mt Dingalan, 300 m, B. S. 26603 Ramos & Edano (A, NY; PNH, †; US, type of *V. angustilimum*, cit. Copel. f., not seen). Isabela prov., F. B. 18568 Alvarez (PNH, †). Zambales prov., Mt Tapulao, F. B. 9503 Curran & Merritt (PNH, †); F. B. 9512 Curran & Merritt; B. S. 5024 Ramos. Mountain prov., Benguet subprov., Mt Nangaoto, B. S. 82453 Quisumbing (A); Mt Natoo, B. S. 40423 Ramos & Edano. Lepanto subprov., Mt Malaya, F. B. 14503 Darling; Bauco, Vanoverbergh 1249. Abra prov., F. B. 14592 (PNH, †), 14668-D Darling (BO). No locality given, Jagor s.n. (B, type of *V. jagori*, †).

221. *V. sylvaticum* Elm., Leaf. Philip. Bot. 3, 1911, 1095; Merr., En. Philip. 3, 1923, 251; Copel. f., Philip. J. Sc. 42, 1930, 588. — *V. mearnsii* Elm., Leaf. Philip. Bot. 3, 1911, 1098; Merr., En. Philip. 3, 1923, 250.

PHILIPPINES. Mindanao, Davao prov., Mt Apo (Todaya), c. 1250 m, Elmer 11819 (A, BM, BO, FI, G, GH, K, L, NY; PNH, type of *V. sylvaticum*, †; US, cit. Copel. f., not seen); ibid., c. 1000 m, Elmer 11251 (A, BM, BO, FI, G, GH, K, L, NY; PNH, type of *V. mearnsii*, †; US, cit. Copel. f., not seen); Mt McKinley, PNH 961 Edano.

222. *V. gjellerupii* J. J. S., Nova Guinea 12 (2), 1914, 163, t. 49; Sleum., Bot. Jahrb. 72, 1942, 253; Kaneh. & Hatus., Bot. Mag. Tokyo 56, 1942, 480.

NEW GUINEA. Northwestern part, Arfak Mts, Angi Lakes, 1800—2100 m, Gjellerup 1132 (BO, type; K, L); Kostermans 2100, 2315, 2510; Kanehira & Hatusima 13475 (FU, cit. Kaneh. & Hatus., not seen); ibid., at 2300 m, Kanehira & Hatusima 13719 (A, BO), fr.

223. *V. laurifolium* (Bl.) Miq., Fl. Ind. Bat. 2, 1859, 1061; Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 39; O. Ktze, Rev. Gen. Pl. 2, 1891, 384; Koord., Exk. Fl. Java 3, 1912, 18; Koord.-Schum., Syst. Verz. 1912, fam. 233, p. 109; J. J. S. in K. & V., Bijdr. 13, 1914, 166; Koord., Fl. Tjib. 1918, fam. 233, p. 11; Doct. v. Leeuwen, Pangrango, 1933, 206, pl. 13; Malm in Fedde Rep. 34, 1934, 284; Amsh. in Back., Bekn. Fl. Java (em. ed.) 7, 1948, fam. 163, p. 4. — *Thibaudia laurifolia* Bl., Bijdr. 1826, 859; Hassk., Cat. Hort. Bog. 1844, 161. — *Thibaudia floribunda* Bl., Bijdr. 1826, 859, non H. B. K. (1818);

Hassk., Cat. Hort. Bog. 1844, 161. — *Agapetes laurifolia* (Bl.) Don, Gen. Syst. 3, 1834, 862; Dun. in DC., Prodr. 7, 1839, 555. — *Agapetes floribunda* (Bl.) Don, Gen. Syst. 3, 1834, 862; Dun. in DC., Prodr. 7, 1839, 555; Mor., Syst. Verz. Zoll. 1846, 42; Hassk., Pl. Jav. rar. 1848, 470; Zoll., Syst. Verz. 2, 1854, 137. — *Thibaudia rosea* Jungh., Nat. Geneesk. Arch. N. I. 2, 1845, 35; Hassk., Flora 30, 1847, 524; Walp., Ann. 1, 1848/49, 475. — *Agapetes rosea* Jungh., Nat. Geneesk. Arch. N. I. 2, 35, nom. event. — *Epigynium laurifolium* (Bl.) Kl., Linnaea 24, 1851, 49. — *Epigynium floribundum* (Bl.) Kl., l. c. — *V. teysmannii* Miq., Fl. Ind. Bat. 2, 1859, 1062; Ann. Mus. Bot. Lugd.-Bat. 1, 1863, 38; Koord., Junghuhn Gedenkb. 1910, 185; Exk. Fl. Java 3, 1912, 13, p.p.; Hall. f., Med. Rijksherb. 12, 1912, 29; Koord., Fl. Tjib. 1918, fam. 233, p. 11; Sp. Moore, J. Bot. 63, 1925, Suppl. 55; Hochr., Candollea 2, 1925, 500. — *V. floribundum* (Bl.) Miq., Fl. Ind. Bat. 2, 1859, 1060, nec H. B. K. (1818). — *V. zollingeri* Miq., Fl. Ind. Bat. 2, 1859, 1061; Koord., Nat. Tijds. N. I. 62, 1902, 232. — *V. cyrtodon* Miq., Fl. Ind. Bat. 2, 1859, 1061. — *V. euanthum* Bl. & Fisch., Fl. Javae, Pl. inéd., 1863/83, t. 24. — *Agapetes polyantha* ('Miq.') Niedenzu, Bot. Jahrb. 11, 1889, 224, 246. — *V. blumeianum* Niedenzu, l. c. 153, in text, 200, 224, 244. — *V. polyanthum* Miq. msc.; O. Ktze, Rev. Gen. Pl. 2, 1891, 385, incl. var. *viridiflorum* O. Ktze & var. *bicolor* O. Ktze, l. c. — *V. fastigiatum* Sp. Moore, J. Bot. 63, 1925, Suppl. 56.

#### var. *laurifolium*.

SUMATRA. Atjeh, confluence of R. Kapi and R. Anuan, 1100—1250 m, *Van Steenis 10002* (fr., determ. not certain). G. Lembuh to bivouac Halfweg, 3000—1850 m, *Van Steenis 9147* (fl. immat., calyx densely ciliate, determ. not certain). East coast, Berastagi, 1475 m, *Lörzing 15791* (fr.). Asahan R., Tutupan, 1100 m, *Lörzing 9933*. Tapanuli, Hutagindjang, NW of Balige, Toba, *Bartlett 8347* (fr.). Lae Pondon, E of Sidikalang, *Alston 14953*. Talun na Uli, Toba, *R. Si Boeea 11016* (fr.). West coast, Mt Tandikat, N of Kandang Empat, *Meijer 3944* (different by a densely muriculate calyx tube). Benkulen, Rimbo Pengadang, *Ajoeb (Exp. Jacobson) 114*. Way Tenong, Kroe, 900 m, *De Voogd 1087* (fl. immat.). G. Dempo, 2285 m, *Forbes 2404* (fl.). G. Pesagi, 1800—2135 m, *Forbes 2053* (BM, type of *V. fastigiatum*; FI, GH, K, L); *De Voogd 1549*; *Van Steenis 3737*. Lampong, G. Tenggamus, 2100 m, *Forbes 1895* (fr.); *Toxopeus 19* (fr.).

Note: Of the Sumatran specimens mentioned here sub var. *laurifolium* only *Forbes 2053* and *Van Steenis 3737* are in flower; they represent the *V. laurifolium* typical as it is in Java. All other materials cited here are in fruit or sterile, or different in various characters as indicated between brackets, and might belong either to var. *ellipticum* or to other, not yet described varieties of *V. laurifolium*.

JAVA. Preanger/Djakarta, G. Gedeh, 1425—2700 m, *Scheffer s.n.*; *Zollinger 480 Z. & 480 Z.H.* (FI, P; U, type of *V. teysmannii*); *Docters van Leeuwen s.n.*; *Sapiin s.n.*; *Bruggeman 3739, 3743*; *Hallier 433*; *Backer 3364, 31311*; *Van Steenis 4976*; *O. Kuntze 4721* (NY, type of *V. polyanthum* var. *bicolor*), 4745 (K; NY, type of *V. polyanthum* var. *viridiflorum*); *Zipelius s.n.* G. Salak, 1250—2215 m, *Lam 2224*; *Koorders 36713*. Tjibodas and vicinity, 1400—2400 m, *Koorders 31562, 32222, 42048*; *Sapei 2446*; *Beccari anno 1874*; *Scheffer s.n.*; *Bruggeman 132*; *Valeton anno 1912*; *Hub. Winkler 1846*; *Hallier 130*; *De Monchy s.n.* G. Pangerango, 1200—3060 m, *Beccari anno 1872*; *Sapiin s.n.*; *Yates 2747*; *Koorders 15627, 32109 p.p.*; *Backer 22352, Kern 7785*; *Van Ooststroom 13345*; *Van Steenis 2040, 2041*; *Docters van Leeuwen 113, 4019, 4020, 5445, 8423*; *De Monchy s.n.*; *Schiffner 2380*; *Wisse 1107*; *Hochreutiner 926*; *Meijer 1216, 1219*; *Hallier 588*; *Möller 53*; *Raap 915*. G. Malabar, 1830—2195 m,



*Forbes* 956, 1028b; *De Vriese s.n.*; *Denker* 81; *Warburg* 3305; *Anderson* 125. Telaga Bodas, *Reinwardt s.n.*; *Docters van Leeuwen s.n.*; *Warburg* 3311. G. Burangrang, *Blume s.n.* (type of *Thibaudia laurifolia*, not preserved). Mandalawangi, *Junghuhn s.n.* G. Tjikorai, *Scheffer s.n.* G. Patuha, 1600—2400 m, *Scheffer & Teysmann s.n.*; *Hildebrand* 237; *De Haan* 23; *Warburg* 3306; *Backer* 12756; *Holstvoogd* 284; *Lörzing* 1338. G. Ragadjembangan, 1800—2100 m, *Backer* 16136. G. Sindanglaya, *Ploem s.n.* Garut, *Burck s.n.* G. Tangkuban Prah, 1600 m, *Docters van Leeuwen* 11418. G. Gegerbintang, 2000 m, *Van Steenis* 2140. G. Sembung, 1250 m, *Backer* 12451. Tjikerang, 1000 m, *Van Steenis* 242; *Bakhuizen van den Brink* 7303. Tjisewu, *Warburg* 3309. G. Papandajan, *Van Steenis* 4205, 11675, 11676; *Van der Pijl* 218. Locality not given, *Horsfield s.n.*; *Kollmann s.n.*; *Korthals s.n.*; *Van Hasselt s.n.*; *Blume s.n.* (type of *V. floribundum* = *V. blumeanum*, not preserved). Cheribon, G. Tjerimai, 1525 m, *Junghuhn s.n.* Banjumas, G. Slamet, 1200—2300 m, *Backer* 423, 447, 466. Kedu, G. Merbabu, 2500 m, *Coert* 122; *Junghuhn s.n.* (L, type of *Thibaudia rosea*); *Warburg* 4265; *Büsgen* 169. G. Merapi, 1200—1300 m, *Junghuhn s.n.* Djeng plateau, 2000—2550 m, *Junghuhn pl. ined.* 515; *Koorders* 11037; *Polak VIII*; *Van Slooten* 387. G. Prah, 2500 m, *Brinkman* 453. G. Sumbing, 2100 m, *Lörzing* 42. Madiun, G. Lawu, 1200—2600 m, *Van Slooten* 2569; *Junghuhn* 81; *Dorgelo* 86, 209; *Elbert* 325, 326, 332; *Waitz s.n.*; *Buwald* 8128. Kediri, G. Wilis, *Waitz s.n.* (L, as *V. polyanthum* Miq., msc.). Malang, G. Kawi, 2500—2730 m, *Arens & Kurth s.n.*; *Docters van Leeuwen* 12247, 12466. G. Lamongan, 1600 m, *Jeswiet s.n.*; *Altmann* 151. Ardjuno-G. Welirang, 2400—3000 m, *Teysmann s.n.*; *Van Steenis* 7148, 11855 ('hemi-epiphyte'); *Bremekamp s.n.*; *Koorders* 38260, 43753; *Wurth* 4; *Rant* 423; *Arens* 81; *Lauterbach* 6146, 6148. G. Kembar, 2900 m, *Bremekamp s.n.* G. Dolowati, 1550 m, *Posthumus* 1865; *Van Oosten* 36. G. Tengger, 2600 m, *Koorders* 38025; *Kobus s.n.*; *De Voogd* 742. G. Semeru, 1750—2500 m, *Coert* 1569; *Backer* 3691. Besuki, Jang plateau, 1900—2000 m, *Koorders* 43962; *Van Steenis* 10981. G. Krintjing, 2135—2440 m, *Zollinger* 2837 (syntype of *V. zollingeri*), 2954 (BM, BO, G, P, U; lectotype of *V. zollingeri*). No locality given, *Zollinger* 1418 (G, P, S; U, type of *V. cyrtodon*, fl. galled).

BALL. Peak of Tabanan, 1800 m, *De Voogd* 1843. G. Batukau, 1840—1875 m, *Sarip (Exp. Maier)* 381, 389.

LOMBOK. Rindjani Mts, 1750—2035 m, *Elbert (Gründler)* 2163, 2220, 2230.

SUMBAWA. G. Batulanta, 1600 m, *De Voogd* 1653 (fr., determ. not certain).

var. *ellipticum* (Bl.) Sleum., nov. stat. — *Thibaudia elliptica* Bl., *Bijdr.* 1826, 859. — *Agapetes elliptica* (Bl.) Don, *Gen. Syst.* 3, 1834, 862; *Dun. in DC., Prodr.* 7, 1839, 555. — *Gaylussacia elliptica* Zoll. & Mor. in Zoll., *Nat. Geneesk. Arch. N. I.* 2, 1845, 9. — *Agapetes floribunda* (Bl.) Don 'var'. *glaberrima* Mor., *Syst. Verz. Zoll.* 1846, 42, nom. nud.; Zoll., *Syst. Verz.* 2, 1854, 137, nom. nud. — *V. javanicum* Hook.,  *Ic. Pl.* 8, 1848, t. 740; Walp., *Rep.* 6, 1846/47, 413. — *Epigynium ellipticum* (Bl.) Kl., *Linnaea* 24, 1851, 49. — *V. floribundum* (Bl.) Miq. var. *glaberrimum* Miq., *Fl. Ind. Bat.* 2, 1859, 1060, nom. nud. — *V. ellipticum* (Bl.) Miq., *Fl. Ind. Bat.* 2, 1859, 1060, excl. descr. & cit. p.p.; *Ann. Mus. Bot. Lugd.-Bat.* 1, 1863, 39, at least p.p.; Hall. f., *Med. Rijksherb.* 1, 1910, 36; J. J. S. in K. & V., *Bijdr.* 13, 1914, 162; Hochr., *Candollea* 2, 1925, 500; Amsh. in Back., *Bekn. Fl. Java* (em. ed.) 7, 1948, fam. 163, p. 4. — *V. laurifolium* (Bl.) Miq. f. *arborescens* O. Ktze, *Rev. Gen. Pl.* 2, 1891, 384. — *V. teysmannii* (non (Bl.) Miq.) Koord., *Exk. Fl. Java* 3, 1912, 13, p.p.; Koord.-Schum., *Syst. Verz.* 1912, fam. 233, p. 111, p.p.

Note: The Sumatran specimens are aberrant at least in one character from typical var. *ellipticum* as it is found in W. Java.

SUMATRA. East coast, Lau Deluk-Deluk, 1300 m, *Docters van Leeuwen* 12812 (pedicels glabrous). West coast, Mt Singgalang, 1700 m, *Beccari s.n.* (FI, tubules rather short, no spurs). Mt Sago, N slope, *Jacobs* 4674 (corolla laxly glandular-muriculate outside; no spurs). Mt Kerintji, *Alston* 14200 (tubules rather short).

JAVA. Bantam, G. Karang, 1770 m, *Koorders* 9681. G. Pulusari, 900 m, *Backer*

7049; Zollinger 1265 (BM, FI, P; U, type of *V. floribundum* var. *glaberrimum*). Preanger/Djakarta, G. Gede, 1300—2200 m, *Junghuhn s.n.*; *Backer* 22268; *Sapei s.n.*; *Van Steenis* 17562; *O. Kuntze* 4687 (K; NY, type of *V. laurifolium* f. *arborescens*); *Van Oostroom* 13974. G. Salak, 600—1600 m, *Blume s.n.* (type of *Thibaudia elliptica*, not preserved); *Lobb s.n.* (K, type of *V. javanicum*); *Van Slooten* 720; *De Voogd & Bloembergen s.n.*; *Koorders* 24447, 24448, 24482; *Raap* 210. Tjibodas region, 1450—1600 m, *Bruggeman* 802; *Van Woerden* 175; *Main* 171; *Eyma* 171; *Burkill* SF 8219; *Koorders* 25833, 25882, 26053, 31635, 31655, 32109 p.p., 42001, 42002; *ibid.*, above Sindanglaya, 1400 m, *Van Steenis* 2871. Tjigonteng, 1420—1700 m, *Koorders* 9668, 9678, 26388. Tjipanas, Telagabodas, 1600 m, *Ja.* 4664 (corolla slightly puberulent, probably due to insects). Kerawang, *De Monchy s.n.* G. Kentjana, *Sugandiredjo* 34, 53. Tjiwidi, *Rant & Smith* 388. G. Kembang, *Sugandiredjo* 147. Tjidadap-Tjibeber, 1000 m, *Bakhuizen van den Brink* 1901, 1902. G. Gegerbintang, 1000 m, *Den Berger* 533. G. Galunggung, 2230 m, *Backer s.n.*; *Koorders* 9673, 9675, 9677. G. Papandayan, 2000 m, *Korthals* 722; *Van Steenis* 6779. G. Perbakti, 1700 m, *Bakhuizen van den Brink* 3647. Telagapatengan, *Van der Pijl* 272. Tjadas malang, 1000 m, *Winckel* 1316 β. G. Wayang, 1850 m, *Smith & Rant* 595; *Hochreutiner* 1571. Tjibureum, *Docters van Leeuwen s.n.* G. Malabar, 2000—2050 m, *Hochreutiner* 1538; *Den Berger* 758. Situ Gunung, 1000 m, *Van Steenis* 5688. Tjantem, S of Leuwiliang, 800—1000 m, *Backer* 25856, 25972. G. Pangrango, 1830—2440 m, *Junghuhn* 85. G. Patuha, 1700 m, *Korthals s.n.*; *Van Steenis* 7437. Telaga Warna, 1600 m, *Buwalda* 8091. Pangentjongan, *Koorders* 26594, 26751, 26783. Tilu, *Reinwardt s.n.* G. Kendeng, *Koorders* 9668. Segara, *Koorders* 9677. Pengalengan, 1300 m, *Junghuhn* 74; *Warburg* 3305a. No locality given, *Lobb* 38, 77; *Van Hasselt s.n.* Kedu, G. Andong, 1300 m, *Koorders* 36577. Djieng, *Hochreutiner* 2380. Semarang, G. Telemojo, *Koorders* 28033, 28034, 36195, 36196. G. Ungaran, 2050 m, *Junghuhn* 80 (infl. glabrescent); *Waitz s.n.*; *Docters van Leeuwen* 2092. Kediri, G. Willis, 1700 m, *Backer* 11607. Malang, Tenger, 1650 m, *Koorders* 37977. G. Dolowati, 1500 m, *Backer & Posthumus s.n.* G. Welirang, 3000 m, *Backer* 37022. G. Smeru, *Kobus s.n.* Besuki, G. Tarub (Lamongan), 1500—1650 m, *Van Steenis* 10763 (fl. galled, corolla slightly pubescent and glandular-muriculate); *Van Dillewijn s.n.* (fl. galled, corolla slightly pubescent and glandular-muriculate). Jang plateau, 1900—2000 m, *Van Steenis* 10801 (fl. galled, corolla slightly pubescent); *Koorders* 43556. G. Hijang, *Van Dillewijn* 111.

Note: Among the specimens cited from Central and East Java are rather many, which show the glandular pubescence especially of the rhachis and pedicels, distinctive for var. *ellipticum* besides other characters, to a much less degree. It is possible, that *V. ellipticum* in its original circumscription is limited to Western Java.

var. **robustum** (Ridl.) Sleum., nov. stat. — *V. robustum* Ridl., J. Fed. Mal. St. Mus. 8, 1917, 57.

SUMATRA. Tapanuli, Pangulubau, 2380 m, *Batten Pool s.n.* Westcoast, G. Malintang, summit region, 2000 m, *Meijer* 3627. G. Merapi, 2300 m, *Van Borssum Waalkes* 2205. G. Sago, near Pajakumbuh, 2000 m, *Meijer* 4873. G. Kerintji, 2020—2700 m, *B. Kloss & Robinson s.n.* (BM, type; SING); *Bünnemeijer* 9469, 9849; *Jacobs* 4311, 4365. G. Singgalang, 2500—2800 m, *Bünnemeijer* 2859; *Beccari s.n.*; *Meijer* 5840. G. Talamau, 1900—2760 m, *Bünnemeijer* 837, 903, 981.

var. **glanduligerum** Sleum., nov. var. — Calycis lobi omnes vel certe pro parte maiore glandula crassa apicali instructi. Thecae calcaribus 2 dorsalibus ornatae. Ceterum vix a var. *laurifolium* diversum.

SUMATRA. Atjeh, confluence of R. Kapi and R. Aunan, 1100—1250 m, *Van Steenis* 9962 (BO, K; L, type), fl. 21-3-1937. East coast, Batak Lands, Toba, *Pringgo Atmodjo* 532. Between Seribu Dolok and Harang gaol, 1200—1250 m, *Lörzing* 14670. Sibatulobeng near Prapat, 1400 m, *Paymans* 11. G. Sibayak, 1700—1850 m, *Lörzing* 6136, 9768; *Yates* 1499.

var. **trichodes** Sleum., nov. var. — Folia elliptico-oblonga, plerumque 1—2 cm longe subacutaeque acuminata, 10—15 cm longa, (4—)5—6 cm lata.

Ramuli, rhachis et pedicelli subdense pilis patentibus albidis brevibus eglanduliferis instructi. Pedicelli crassiusculi, sub anthesi (1—)2—3 mm longi. Calyx dorso parcepilosus, ultro ad basin pilis glanduloso-muriculatis obsitus, lobis subacutis brevibus, glandula apicali carentibus. Corolla tenera, alba, glabra, c. 8 mm longa, 2,5 mm diam. Stamina iis var. elliptici simillima.

SUMATRA. Westcoast, G. Sago near Pajakumbuh, 1500—1600 m, *Meijer 5114* (BM, G; L, type), fl. 19-6-1951; *ibid.*, summit Galunggung, 1440 m, *Meijer 3532*.

var. **pensile** (Sp. Moore) Sleum., nov. stat. — *V. pensile* Sp. Moore, J. Bot. 63, 1925, Suppl. 55.

SUMATRA. Benkulen/Palembang, G. Dempo, 1525 m, *Forbes 2432* (cit. '2433', BM, type; CAL, FI, GH, K, L, P, SING).

var. **sarawakense** (Merr.) Sleum., nov. stat. — *V. sarawakense* Merr., J. Str. Br. R. As. Soc. 76, 1917, 105; En. Born. 1921, 467. — *V. hosei* Merr., J. Str. Br. R. As. Soc. 76, 1917, 106; En. Born. 1921, 466. — *V. ellipticum* (Bl.) Miq. var. *macrocalyx* J. J. S., msc.; Merr., En. Born. 1921, 466, nom. nud.

BORNEO. Sarawak, Kuching, B.S. 2177 Nat. Coll. (A, K; PNH, type of *V. sarawakense*, †). Baram, *Hose 236* (BM, K; PNH, type of *V. hosei*, †); *ibid.*, *Haviland & Hose 3464*. North Borneo, Mt Kinabalu, 1065—1525 m, *Clemens 27123, 29755, 31525, 32129; Carr SF 26479*. Western part, G. Kenepai, *Hallier 1975* (anthers with 2 distinct spurs). Central Eastern part, Mt Kemul, 1200 m, *Endert 3560* (fr.), *3841* (fr.).

224. ***V. turfosum*** Sleum., nov. spec. — *V. sp.*, Rappard, Nova Guinea n.s. 10, 1959, pl. V, at right below. — Frutex usque ad 5 m altus, filamentis lobisque calycinis pilosis exceptis omnino glaber. Ramuli subgraciles, cito corticati, laxe usque subdense foliati; gemmae axillares subglobosae. Folia anguste ovata vel subelliptico- vel oblongo-ovata, apice subabrupte per 1—1,5 cm (sub)caudato-acuminata, subacuta, basi rotundata, interdum ad ipsam basin brevissime in petiolum contracta, glandulis basalibus parvis in utroque latere singulis interdum in ipso petioli apice instructis obsita, coriacea, nitidula, integra, margine paullo revoluta, (3,5—)4—6(—7) cm longa, 1,5—2 (—2,3) cm lata, costa supra levissime impressa, subtus parum prominente, nervis utroque latere 2—3 basalibus vel paullo suprabasalibus alteque curvato-ascendentibus et anastomosantibus, superioribus brevioribus paucis vel nullis, omnibus supra subinconspicuis, subtus parum visibilibus, venis venulisque laxe reticulatis ± obsoletis; petioli 4—6(—8) mm longi, ± 1 mm crassi. Racemi ex axillis superioribus 2 vel 3 oblique ascendentes, 12—20-flori, floribus secundis subdense aggregatis; rhachis angulata, sat robusta, 3—6(—8) cm longa, florendi tempore eperulata. Pedicelli inter graciliores, sub anthesi 5—9(—12) mm longi, demum recurvati, bracteis bracteolisque haud visis. Calycis tubus subsemigloboso-campanulatus, rugosulus, 1—1,5 mm longus, limbo patenti vel demum reflexo profunde 5-partito, lobis deltoideis acutis ciliatis apice penicillatis c. 1,3 mm longis. Corolla (urceolato-)tubulosa, tenera, lactea, extus glabra, intus ad lobos pilosula ceterum glabra, 12—13(—14) mm longa, medio 4(—5) mm diam., infra lobos paullo angustata, lobis obtuse deltoideis suberectis vel denique reflexis, c. 1,5 mm longis. Stamina 10; filamenta subsubulato-lineararia, alternatim 3—4 et 4—5 mm longa, dense longeque subpatenter pilosa; thecae oblongae, ecalcaratae, c. 1,3 mm longae; tubuli thecis paullo angustiores, cylindracei, apice oblique scissi, 0,8 mm longi, pariete postico



utriusque tubuli haud raro in dentem unicum vel plerumque in dentes duos suberectos saepius inaequales extenuato. Discus prominens, glaber. Stylus gracilis, corollam subaequans, vel denique paullo exsertus, glaber vel plerumque basi laxepilosus. Fructus globosus, c. 6 mm diam., disco magno calycis lobos superante coronatus.

NEW GUINEA. Western part, Wissel Lake region, Edarotali, 1800 m, *B.W.* 894 *Rappard*, rather common on open peaty places, fl. 26-10-1955 (phot. in *Rappard*, l. c.); *ibid.*, Arupa, 1750 m, *B.W.* 3074 *Versteegh* (K; L, type); bivouac Prauw, 1740 m, *Eyma* 4326; 'bivouac voet-bivouac Moeie', *Eyma* 5061.

225. *V. gracilipes* Sleum., nov. spec. — Arbuscula erecta, filamentis pilosis exceptis in omnibus partibus glaberrima, trunco c. 10 cm diam. Ramuli graciles, subteretes, laxe foliati. Folia lanceolato-oblonga vel -elliptica, apice subabrupte usque sensim breviter (1—1,5 cm) caudato-acuminata, apice extremo acutiuscula, basi in petiolum cuneata, glandulis basalibus marginalibus minutis utroque latere singulis, a petiolo 2—3(—4) mm distantibus, tenuiter coriacea, glabra, subtus sparse minute punctata, integra, ad ipsam marginem paullo revoluta, 4—7(—8) cm longa, (1,5—)2—3 cm lata, costa supra angustissime immersa, subtus anguste obtuseque prominente, nervis utroque latere 2—3 basalibus et parum suprabasalibus, alte curvato-ascendentibus, aliis superioribus subparallelis brevioribus 2—3, omnibus anastomosantibus et supra minute, subtus distinctius elevatis, interdum supra subinconspicuis, reticulatione densa subtus tantum prominula; petioli sat graciles, subteretes, 7—9(—11) mm longi,  $\pm$  1 mm diam. Racemi ex axillis superioribus 2—5 (interdum partim iam defoliatis) orti, gracillimi, patentes vel recurvati, laxe multi- et secundiflori; rhachis (5—)6—9 cm longa, basi c. 0,5 mm diam., eperulata. Pedicelli subfiliformes, sub anthesi 10—15(—17) mm longi, bracteis bracteolisque haud visis. Calycis tubus obconicus, vix 1 mm longus, limbus vix 0,5 mm altus, patens, undulatus, vel leviter 5-lobus, lobis late deltoideis, obtusiusculis, haud ciliatis, glandula terminali carentibus. Corolla urceolato-ventricosa, infra lobos contracta, tenera, puralbida, fragrantissima, extus glabra, intus inferne pilosula, 6—7 mm longa, medio 3—4 mm diam., lobis ovatis obtusis 0,7 mm longis demum reflexis. Stamina 10; filamenta subulata, omnino dense pilosa vel subvillosa,  $\pm$  2,5 (—3) mm longa; thecae oblongae, ecalcaratae, 1 mm longae; tubuli thecis angustiores, elongato-cylindrici, 1,2—1,5 mm longi, apice oblique scissi, pariete postico utriusque tubuli in dentes 2 erectos c. 0,3 mm longos exeunte. Discus prominens, glaber. Stylus gracilis,  $\pm$  7 mm longus, glaber, denique parum exsertus. Bacca ignota.

SUMATRA. Atjeh, bivouac 9 on Lau Alas R., 1200 m, *Van Steenis* 8725 (A, BO, BRI, K; L, type; P, PNH, SING), fl. 7-2-1937; Gajolands, Gajoluas, *Pringgo Atmodjo* 110 (BO, L).

226. *V. pseudocaudatum* Sleum., nov. spec. — Arbuscula 3—4 m alta, trunco c. 5 cm diam. Ramuli graciles, in partibus recentissimis minutissime puberuli, ceterum glabri citoque corticati et striati, laxe foliati. Folia oblongo-lanceolata, apice 1—1,5(—2) cm longe subcaudato-acuminata, apice extremo subacuta vel obtusiuscula, basi in petiolum cuneata, basi utroque latere glandula marginali minuta, ultro interdum in superiore tertio tantum glandulis minutis (vel crenaturis) paucis subinconspicuis instructa, coriacea, glabra, subtus laxissime punctata, lucidula, integra, angustissime marginata vix revoluta,

5—7(—8) cm longa, (1,5—)2—2,5 cm lata, costa supra inferne parum immersa, subtus inferne obtuse prominente, superne  $\pm$  evanescente, nervis utroque latere basalibus paulloque (usque ad 1 cm) suprabasalibus 3 alte curvato-ascendentibus, inter sese et cum venis transversalibus anastomosantibus, supra vix, subtus distinctius prominulis, reticulatione subdensa, plerumque sat obsoleta, vel subtus tantum parum visibili; petioli a dorso compressi et sulcati, 6—8(—10) mm longi,  $\pm$  1 mm diam. Racemi ex axillis superioribus 5—12, subdense 10—15-flori, patuli vel recurvati; rhachis subgracilis, sicut pedicelli et calyx sub lente subdense minute patenti-pubescent vel -puberula, (2—) 3—5 cm longa, sub anthesi eperulata. Pedicelli crassiusculi, 3—4(—5) mm longi, curvati, bracteis haud visis, bracteolis basalibus subulatis 1 mm longis citissime caducis. Calycis tubus obconico-campanulatus, basi saepius brevissime contractus et subtruncatus, 1 mm longus, limbus suberectus profunde 5-partitus, vix 1 mm altus, lobis deltoideis subacutis, apice ciliolatis, glandula apicali minuta vel nulla. Corolla urceolata, tenera, alba, utrinque glabra, 6(—7) mm longa, 2,5 mm diam., lobis ovatis obtusis reflexis 0,7 mm longis. Stamina 10; filamenta anguste subulato-lineararia, ad  $\frac{1}{4}$  inferiorem partem tantum longepilosa, ceterum glabra, 2,5 mm longa; thecae oblongae, ealcaratae, 0,8 mm longae; tubuli anguste cylindrici, thecis paullo angustiores, erecti, 1,5 mm longi, apice oblique scissi, pariete postico utriusque tubuli breviter  $\pm$  irregulariter bidentato. Discus prominens, sat dense albido-erecto-pilosus. Stylus sat gracilis, glaber, c. 6 mm longus. Bacca immatura subglobosa, 3 mm diam., laxe pubescens, calycis lobis erectis discoque pubescenti coronata, pedicello 6—8 mm longo.

PHILIPPINES. *Mindanao*, Bukidnon prov., So. Bagumbaan, Maramag, near the creek along the edge of grassland, 670 m, *F. B. 31527 Franco* (NY, type), fl. 17-2-1932; Mt Katanglad, *PNH 9874 Sulit* (L), fr.

227. *V. benguetense* Vid., Rev. Pl. Vasc. Filip. 1886, 168; Merr., Philip. J. Sc. 3, 1908, Bot. 376; l.c. 5, 1910, Bot. 372; En. Philip. 3, 1923, 248; Copel. f., Philip. J. Sc. 42, 1930, 566, pl. 3, f. 9—11.

PHILIPPINES. *Luzon*, Mountain prov., Benguet subprov., *Vidal 1515* (fr., syntype), 1534 (FI; K, lectotype; L; MA, not seen); Baguio, 1300 m, *Elmer 8663*; *Santos 9*; Bugias, *Merrill 4653*; Mt Pulog, *F. B. 18206 Curran, Merritt & Zschokke*; Mt Data, *Loher 3777*. Lepanto subprov., Mankayan, *F. B. 10930 Curran*; Bauco, *Vanoverbergh 55* (US, cit. Copel. f., not seen). Bontoc subprov., *Vanoverbergh 56, 2023* (P); *F. B. 17006 Curran* (BRI); Mt Masapilid, *B. S. 37892 Ramos & Edano*; Abra prov., *F. B. 14600 Darling* (PNH, †); *F. B. 14661 Darling* (PNH, †). Ilocos Norte prov., Mt Piao, *F. B. 14000 Merritt & Darling* (BO). Ilocos Sur prov., *F. B. 25488 Paraiso* (A). Zambales Prov., Mt Pinatubo, *Elmer 21950*; *Loher 6041* (K); *B. S. 2564, 2566 Foxworthy*; *B. S. 2579 Foxworthy* (US, cit. Copel. f., not seen); *Clemens 17467, 17468*; Mt Tapulao, *B. S. 4983 Ramos*. 'Luzon Central', *Loher 3781*. *Panay*, prov. Ilo-ilo, Miagao, Mt Pulacan, 900 m, *Vidal 3145* (A, K).

228. *V. caudatum* Warb. in Perk., Fragm. Philip. 1905, 173; Merr., Philip. J. Sc. 3, 1908, Bot. 376; En. Philip. 3, 1923, 248; Copel. f., Philip. J. Sc. 42, 1930, 565, pl. 3, f. 7—8. — *V. sp.*, Vid., Phan. Cum. Philip. 1885, 25, 123.

PHILIPPINES. *Luzon*, Albay prov., *Cuming 905* (B, lectotype, †; BM, FI, G, K, L). Laguna prov., Siniloan, *Warburg 13753* (B, syntype, †; E). Paete, San Antonio, *B. S. 14970 Ramos*; *B. S. 22771, 22865* (PNH, †), 22879 *McGregor*. Rizal prov., Montalban, *Loher 12154* (UC, cit. Copel. f., not seen), 12196a (P); Balacbac, *Loher 14965*. Quezon

prov., S. Bakong, Famy, PNH 34961 *Lagrimas*. Cagayan prov., Pinagteponan R., B.S. 78333 *Edano*. Mindoro, Magasauangtubig, F.B. 12033 *Rosenbluth* (PNH, †); F.B. 12194 *Rosenbluth*. Panay, Capiz prov., Libacao, B.S. 35450 *Martelino & Edano*; Mt Salibongbong, B.S. 35609 *Martelino & Edano*. Ilo-ilo prov., Ulian R., B.S. 18238 *Robinson*. Leyte, Jaro, *Wenzel* 1118. Mindanao, Surigao prov., Placer, *Wenzel* 2556, 3001 (cit. Copel. f., not seen), 3119, 3443 (cit. Copel. f., not seen), 2 G (UG, cit. Copel. f., not seen).

229. *V. steinii* Sleum., Bot. Jahrb. 72, 1942, 255.

WAIGEU. Majalibit Bay, *G. Stein* 226 (B, type, †).

230. *V. blepharocalyx* Schltr, Bot. Jahrb. 55, 1918, 176; Sleum., l. c. 72, 1942, 256.

NEW GUINEA. Northern part, Sepik Distr., Hunstein Mts, ('Hunsteinspitze'), 1300—1400 m, *Ledermann* 11257 (B, †), 11383 (B, type, †), 11462a (B, †).

231. *V. sparsum* Sleum., nov. spec. — Arbor parva, c. 4 m alta. Ramuli obtusanguli, glabri, laxe foliati. Folia elliptica vel subovato-elliptica, apice breviter (1—1,5 cm) subabrupte acuminata, acuta, basi late attenuata, ipsa basi breviter in petiolum contracta resp. aliquot decurrentia ibique utroque latere glandula parva instructa, coriacea, subtus disperse brevissime adpresse glanduloso-pilosula, ceterum glabra, integra, in sicco nitidula, 5—7 cm longa, 3—4 cm lata, costa supra anguste impressa, subtus imprimis bene prominente, nervis utroque latere basalibus et paullo (usque ad 1 cm) suprabasalibus 3, superioribus altius a costa abeuntibus (seu venis) paucis, omnibus suberecto-ascendentibus et anastomosantibus, supra parum, subtus magis elevatis, reticulatione densa utrinque imprimis subtus prominula; petioli supra canaliculati, ± applanati, 4—6 mm longi, 1—1,5 mm crassi. Racemi ex axillis summis 2—3 orti, oblique erecti, laxe 6—10-flori; rhachis sat robusta, basi 1—1,5 mm crassa, glabra, angulata. Pedicelli sub anthesi ± 1 cm longi, c. 0,5 mm crassi, glabri, sed infra calycem (sicut in toto calyce) pilis glandulosus muriculatis instructi; bractee bracteolaeque haud visae. Calycis tubus cupulatus, rugulosus, 2 mm longus, limbus erecto-patens, 1,5 mm altus, profunde 5-lobus, lobis depresso-ovatis obtusis ciliatis 1 mm longis. Corolla late urceolata, crasse carnosa, rosea, utrinque glabra, c. 9 mm longa, 4—5 mm diam., lobis obtusis subreflexis fere 2 mm longis. Stamina 10; filamenta subulata, 4 mm longa, ad ipsam basin dilatata et glabra, ceterum usque ad apicem dense pilosa; thecae oblongae, ecalcaratae, 1,6—1,8 mm longae; tubuli cylindrici, parum divergentes, thecis fere dimidio angustiores, oblique scissi, 0,5—0,6 mm longi. Discus annularis, glaber. Stylus crassiusculus, glaber, 6—7 mm longus. Bacca haud visa.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Wilhelm, E slope, Pengaga Creek, 2700 m, *Brass* 30514 (L, type), fl. 14-7-1959.

232. *V. striicaule* Sleum., Bot. Jahrb. 72, 1942, 256. — *V. blepharocalyx* (non Schltr) Lane-Poole, For. Res. 1925, 130. — *V. longiporum* (non Schltr) Diels, Bot. Jahrb. 62, 1929, 487.

var. *striicaule*.

NEW GUINEA. Northeastern part, Morobe Distr., Mt Saruwaged, 2400—3300 m, *Clemens* 7293 (A, B), 9936 (A; B, holotype †, isotype preserved), 9961 A (A, B), 9976 p.p. (B, †), 9976 A (A, B), 10056 (B), 10093 A (B); *Keysser* (sub n. 171, BM, '*V. longiporum*'). Near Busu R., *Clemens* 5258 (A, B). Samanzing vicinity, 2300—



2600 m, *Clemens* 9346 (A, B). Mongi R. valley, 2440 m, *Lane-Poole* 521 (BRI, '*V. blepharocalyx*').

var. **pubiflorum** Sleum., Bot. Jahrb. 72, 1942, 257.

NEW GUINEA. Northeastern part, Morobe Distr., Mt Saruwaged, 3000—3300 m, *Clemens* 9976 *p.p.* (B, type, †).

var. **adenodes** Sleum., var. nov. — Calycis lobi certe partim glandula apicali crassa instructi; ceterum a var. striicaule vix distinctum.

NEW GUINEA. Eastern part, Western Highlands, Mt Hagen, 3350 m, *Robbins* 1035 (CANB), 1053 (CANB, type), fl. 8-7-1957; *ibid.*, 2285 m, *Gilliard s.n.* (A).

233. **V. gracillimum** J. J. S., Med. Rijksherb. 25, 1915, 12; Nova Guinea 12 (5), 1917, 530; l. c. 1918, t. 219; Sleum., Bot. Jahrb. 72, 1942, 254.

NEW GUINEA. Southern part, Oranje Mts, Erica top, 1520 m, *Pulle* 812 (BO, type; K, L). Hellwig Mts, Bijenkorf bivouac, 1700—1900 m, *Pulle* 704 *p.p.*, 839.

234. **V. rubroviolaceum** Sleum., nov. spec. — Frutex debilis usque ad 3 m altus. Ramuli gracillimi, ad partes novellas dense breviter pilosi, ad partes vetustiores glabrescentes citoque griseo-corticati, laxe foliati. Folia lanceolata, apicem versus subfalcato-caudato-acuminata, apice ipso obtusiuscula, basi late attenuata vel rotundata, utroque latere glandula marginali parva c. 2 mm a petiolo remota instructa, subcoriacea, subtus laxissime glanduloso-muriculata vel -punctulata, ceterum glabra, integra, 3—4,5 cm longa, 0,5—0,9(—1) cm lata, costa supra per totam longitudinem impressa, subtus parum elevata, nervis utroque latere basalibus 1, superioribus 2—4, supra levissime impressis vel obscuris, subtus parum prominulis, interdum subinconspicuis, reticulatione nulla; petioli graciles, subteretes, (2—)3(—4) mm longi, initio pubescentes. Racemi ex axillis superioribus 1—3 orti, suberecti, laxe (4—)5—8-flori, in omnibus partibus exterioribus glabri; rhachis gracillima, (0,5—)1—4 cm longa. Pedicelli gracillimi, ± horizontaliter patentes, (1,3—)1,5—1,8 cm longi, infra calycem aliquot incrassati, bracteis bracteolisque haud visis. Calycis tubus obconicus, basi truncatus, rugulosus, sub anthesi 2,5—3 mm longus, limbus suberectus, fere 2 mm altus, profunde 5-lobus, lobis subdeltoideis subacutis margine pallidioribus et ciliolatis, glandula apicali nulla. Corolla anguste urceolata, carnosa, rubroviolacea, utrinque glabra, c. 9 mm longa, inferne c. 2,5 mm diam., lobis c. 1 mm longis. Stamina 10; filamenta subulata, 2,3 mm longa, ad basin per 0,3 mm glabra et colorata, per mm 0,5 sequ. dense longepilosa, superne glabra; thecae oblongae, ecalcaratae, c. 0,9 mm longae; tubuli thecis aequilati, 0,2—0,3 mm longi, suboblique truncati. Discus crasse annularis, glaber. Stylus crassiusculus, glaber, 9 mm longus. Fructus submaturus subglobosus, c. 4 mm diam., matura saturate violaceus, calycis lobis erectis coronatus.

NEW GUINEA. Central part, Star Mts, Mt Antares, c. 3000 m, *Kalkman* 4478 (L, type), fl. 23-7-1959, in semialpine vegetation.

### Imperfectly known

235. **V. sumatranum** Jack, Mal. Misc. 2, 1822, 18, reimpr. Hook., J. Bot. 1, 1834, 370; Miq., Fl. Ind. Bat. 2, 1859, 1063; l. c. Suppl. 1, 1860, 251; Copel. f., Philip. J. Sc. 47 (1), 1932, 96, nota; Merr., J. Arn. Arb. 33, 1952, 249.

SUMATRA. Benkulen, G. Bungo (Bungsu, Ben(g)koh, Sugarloaf Mt), 1034 m, *Jack s.n.* (type, not preserved).

Note: The description is insufficient, the type material lost and no topotype yet collected. Probably near *V. laurifolium* (Bl.) Miq., and possibly identical with it.

### Excluded

*V. apoanum* Merr., Govt. Lab. Publ. Philip. 29, 1905, 39 = *Dimorphanthera apoana* (Merr.) Schltr.

*V. calelanum* Elm., Leaf. Philip. Bot. 3, 1911, 1096 = *Dimorphanthera apoana* (Merr.) Schltr.

*V. ? corymbiferum* Miq., Fl. Ind. Bat. Suppl. 1, 1860, 588. — The type of this species was from Sumatra, Tapanuli, Sipirok, c. 1000 m, leg. Junghuhn. There is no authentic specimen left in the Utrecht Herbarium, and from the diagnosis it must be concluded that this species does not belong to the *Ericaceae*.

*V. costeroides* Merr., En. Philip. 3, 1923, 248 (nom. nov. pro *Diplycosia lucida* Merr. 1916, non *V. lucidum* (Bl.) Miq. 1859) = *Costera lucida* (Merr.) Airy Shaw & J. J. S.

*V. lanaense* Merr., Philip. J. Sc. 3, 1908, Bot. 161, 372 = *Costera lanaensis* (Merr.) Airy Shaw & J. J. S.

*V. loheri* Merr., Philip. J. Sc. 7, 1912, Bot. 323 = *Costera loheri* (Merr.) Airy Shaw & J. J. S.

*V. medinilloides* Elm., Leaf. Philip. Bot. 3, 1911, 1097 = *Costera lanaensis* (Merr.) Airy Shaw & J. J. S.

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FLORAE MALESIANAE PRECURSORES XXIX  
SUPPLEMENTARY NOTES TOWARDS THE KNOWLEDGE  
OF THE GENUS RHODODENDRON L. IN MALAYSIA

by

H. S L E U M E R

(Rijksherbarium, Leiden)

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Since the beginning of the printing of the author's revision of 'The Genus *Rhododendron* in Malaysia' in July 1959 (published in *Reinwardtia* 5, 2 (March 1960) 45-231), recently collected herbarium material especially from Borneo and New Guinea has amounted to such an extent, that a supplement becomes necessary.

The numbers refer to those given in the author's above cited work.

3. *R. pulleanum* Koord.

var. *maiusculum* Sleum.

NEW GUINEA. Central part, Star Mts, Mt Antares, 3300—3400 m, *Kalkman* 4500, 4536, fl. red to light red 23/26-7-1959, rather common in alpine shrub vegetation.

4. *R. nummatum* J. J. S.

NEW GUINEA. Central part, Star Mts, Mt Antares, 3000 m, *Kalkman* 4484, fl. 23-7-1959, in semialpine shrub vegetation. Eastern part, Morobe Distr., Kaindi (= Wau), 2060 m, *Brass* 29747, on open clayey ground of old gold workings.

5. *R. gaultheriifolium* J. J. S.

var. *gaultheriifolium*

NEW GUINEA. Eastern part, Eastern Highlands, Mt Wilhelm, 3500 m, *Brass* 30078.

var. *expositum* Sleum.

NEW GUINEA. Central part, Star Mts, Mt Antares, 3000 m, *Kalkman* 4484 A, fl. fr. 23-7-1959, in semialpine shrub vegetation.

11. *R. saruwagedicum* Foerster.

var. *saruwagedicum*

NEW GUINEA. Eastern part, Mt Michael, 3290—3650 m, *Brass & Collins* 31273 (with anomalous calyx lobes).

12. *R. invasorium* Sleum.

NEW GUINEA. Eastern part, Morobe Distr., Kaindi (= Wau), c. 2000 m, *Brass* 29517, 29748, frequent on open clayey ground of old gold workings.

24. *R. quadrasianum* Vid.var. *villosum* J. J. S.

BORNEO. Brunei, G. Pagon ridge, 1675 m, *Ashton BRUN 2345, 2346*, in elfin woodland on rugged hill crest.

26a. *R. protandrum* Sleum., spec. nov. — Frutex c. 2,5 m altus, divaricato-ramosus. Ramuli subgraciles, ad partes novellas  $\pm$  2 mm diam. dense lepidibus crassiusculis rotundis obsiti; internodia (2—)3—6(—8) cm longa. Folia in pseudoverticillis 4—5-meris ad nodos 2—3 ultimos disposita, elliptica, apice  $\pm$  late subacuminata, vel interdum obtuse apiculata, basi late attenuata vel subcuneata, coriacea, in sicco opaca, initio utrinque subdense lepidota, aetate supra  $\pm$  glabrescentia coloreque plumbea, subtus dilute brunnea et subdense  $\pm$  persistenter lepidota (lepidibus parvis (sub)rotundis, zona marginali angusta, centro crasso flavescenti parum impresso), integra, angustissime marginata, 3—5 cm longa, (1,6—)2—3 cm lata, costa supra anguste immersa, subtus inferne petioli crassitudine valdeque prominente, sursum sensim decrescente, nervis lateralibus utroque latere 4(—6) patentibus sat strictis, supra impressiusculis, subtus parum prominulis, haud raro utrinque obscuris, reticulatione nulla; petioli 4—6 mm longi,  $\pm$  1 mm crassi, supra sulcati. Umbellae 5—8(—10)-florae. Perulae membranaceae, exteriores ovatae, apiculatae vel obtusae, interiores obovato-oblongae vel oblongae, dorso glabrae, usque ad 1 cm longae et 0,8 cm latae, apice glanduloso-fimbriatae. Bracteolae subspathulato-lineares, glabrae, usque ad 8 mm longae et c. 1 mm latae. Pedicelli graciles, sub anthesi 5—7(—10) mm longi, subdense lepidibus rotundis obsiti, epilosi. Calyx suboblique patelliformis,  $\pm$  2,5 mm diam., dorso lepidotus, breviter 5-lobus, lobis irregularibus obtusis vel subacutis. Corolla tubulosa, ad lobos  $\pm$  horizontaliter expansa, omnino alba vel subvirescenti-albida, vel ad tubum dilute rosea, ad lobos puralba, extus omnino dense lepidibus rotundis crassis luce  $\pm$  transparentibus obsita, intus ad inferiorem tubi tertia parte pilis brevibus retrorsis adpersa, ceterum glabra, tubo recto vel subcurvato,  $\pm$  2,5 cm longo, ipsa basi paullo dilatata, ceterum per totam longitudinem aequaliter 2—2,5 mm diam., lobis subspathulato-oblongis, 5—6 mm longis,  $\pm$  3 mm latis, sub plena anthesi  $\pm$  reflexis. Stamina 10, iam initio anthesis (stylo tunc in corollae tubo incluso) e corollae tubo valde exserta et erecta, postea filamentis recurvata; filamenta subfiliformia, alba, in  $\frac{1}{4}$  infer. parte laxe vel subdensius pilosa; antherae oblongae, basi obtuse, 1,8 mm longae, 0,5 mm latae. Discus parum prominens, in margine superiore tantum laxe erecto-pilosus. Ovarium cylindricum, c. 5 mm longum, 1,5 mm diam., subdense subappresse breviterque pilosum et lepidotum, cum stylo continuum, stylo rubescente gracili sub anthesi gradatim elongato, tempore staminum reflexorum plane evoluto valdeque e corollae tubo exserto, fere usque ad apicem subdense rotundato-lepidoto, ultro per centimetrum basale laxepilosum, stigmatate subcapitato, brevissime 5-lobo. Capsula submatura anguste fusiformis, rubescens, laxe lepidota et pilosa, 2,5—3 cm longa, 2,5—3 mm diam., sat profunde longitudinaliter 5-sulcata.

NEW GUINEA. Central part, Orion Mts, Sibil R. valley, 1260 m, *Kalkman 4284* (L. type), fl. 15-6-59, in shrub vegetation on poor impervious white clay; *ibid.*, *Kalkman 4553*, fr. 25-8-59, common locally.

Related to *R. cinchoniflorum* Sleum., which has smaller leaves, an exclusively lepidote ovary and the stamens hardly exserted from the throat.



28. *R. herzogii* Warb.

NEW GUINEA. Eastern part, Morobe Distr., Edie Creek Road, 1830 m, N. G. F. 11804 Womersley.

29. *R. incommodum* Sleum.

NEW GUINEA. Eastern part, Eastern Highlands, Purosa, Okapa area, 1950 m, Brass 31614, common high epiphyte in mixed rainforest, fl. red; Okapa patrol post, 2070 m, N. G. F. 10639 Henty (LAE).

These specimens differ from the type by laxly hairy filaments, and anthers but 2 mm long.

35. *R. superbum* Sleum.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Michael, 3000 m, Brass 31434.

36a. *R. stelligerum* Sleum., spec. nov. — Frutex 1—1,5 m altus, sparse erecto-ramosus. Ramuli graciles, in partibus novellis densissime aureo-stellato-lepidoti, in partibus vetustioribus glabrescentes et cinerascentes; internodia superiora (1,5—)3—7 cm longa, 1,5—2 mm diam. Folia in pseudovorticillis 4—5-meris ad nodos 2(—3) ultimos disposita, sublineari-lanceolata, apice basique aequaliter attenuata, apice ipso subacuta, coriacea, initio utrinque densissime aureo-stellato-lepidota, aetate supra glabrescentia tactuque asperula, subtus diu densissime lepidota (lepidibus sese pro parte tegentibus, apici tuberculi epidermalis persistentis impositis, in zona marginali sat lata profunde et valde irregulariter stellato-incisis vel -laceratis, laciniiis apice extremo filiformibus, centro sat magno saturate castaneo, deorsum in pedem brevem vel brevissimum extenuato), integra, margine valde revoluta, (2—)2,5—4,5 cm longa, in statu revoluta (0,3—)0,4—0,8 cm lata, costa supra vix indicata, subtus obtuse valdeque prominente, nervis inconspicuis; petioli densissime lepidoti, 4—6 mm longi, c. 1 mm crassi. Gemmae floriferae ovoideo-oblongae, c. 1 cm longae; perulae exteriores late subulatae, interiores sequentes ovatae, apice subabrupte in acumen 2—3 mm longum extenuatae, dorso leviter carinatae apiceque dense lepidotae, intimae ovato-oblongae, obtusae,  $\pm$  glabrae, omnes dense lepidoto-fimbriatae, usque ad 1 cm longae et 0,5 cm latae. Bracteolae filiformes, laxae caduce lepidotae, usque ad c. 1 cm longae. Flores 2 vel 3, rarius solitarii. Pedicelli omnino lepidibus stellatis aureis obtecti, 1,2—1,6 cm longi, 0,7—1 mm diam. Calyx discoideus, parum obliquus, breviter 5-lobus (lobo uno alterove interdum in laciniam angustam usque ad 8 mm longam aucto),  $\pm$  2,5 mm diam., dorso dense lepidotus. Corolla inferne tubulosa, sursum sensim subcampanulato-dilatata, saepius curvata, distincte zygomorpha, saturate rosea, in sicco colore magenta praedita, extus ad tubum et loborum basin subdense lepidibus stellatis aureis pilisque crispulis albidis induta, intus et ad lobos omnino glabra, tota 3,5—4 cm longa, tubo (2—)2,5—3,2 cm longo, basi 5—6, infra lobos 7—9 mm diam., lobis ipsis erecto-patentibus, late spathulatis vel obovatis, 0,7—1(—1,2) cm longis et 0,6—0,8 cm latis. Stamina 10, inaequilonga, e corollae tubo  $\pm$  longe exserta, longissima dimidiam loborum partem aequantia; filamenta per totam longitudinem linearia, inferne 1, superne 0,5 mm lata, glaberrima; antherae obovato-oblongae, 2—2,5 mm longae, in superiore tertio 1,5 mm latae. Discus parum prominens, glaber. Ovarium subcylindricum, c. 5 mm longum, 2,5 mm crassum, densissime lepidibus profunde stellato-

incisis aureis pila stellata aemulantibus obtectum, certissime epilosum, sursum in stylum gradatim abiens, stylo ipso per  $\frac{3}{4}$  infer. partem dense vel superne laxius lepidoto laxaque piloso, in summa parte tantum glabro; stigma crasse turbinatum, brevissime 5-lobum. Capsula matura subcylindrica, parum curvata, dense stellato-lepidota, epilosa, 2—2,5 cm longa, 0,4 cm diam., demum loculicide 5-fissa. Semina angustissima fere filiformia, 4 mm longa, utrinque longe caudato-appendiculata.

NEW GUINEA. Central part, Star Mts, Mt Antares, 3000 m, *Kalkman 4471* (K; L, type), fl. 22-7-1959, in semialpine shrub vegetation, common.

### 39. *R. delicatulum* Sleum.

var. *lanceolatoides* Sleum., nov. var. — Foliis latioribus ovato-lanceolatis (2,5—)3,5—5 cm longis, 0,7—1,2 cm latis, pedicellis brevioribus 5—7 mm longis a typo diversum.

NEW GUINEA. Central part, Star Mts, 1 km E of the mouth of the Minam R. into the Bon R., 1500 m, *Kalkman 4400 A* (L, type), on peaty soil.

### 42. *R. dielsianum* Schltr.

var. *stylotrichum* Sleum.

NEW GUINEA. Eastern part, Eastern Highlands, road between Kami and Lufa, 1920 m, *Brass 31141*, common.

### 45. *R. beyerincianum* Koord.

NEW GUINEA. Central part, Star Mts, E of mouth of the Minam R. into the Bon R., 1500 m, *Kalkman 4423*; Mt Antares, 2360 m, *Kalkman 4444*. Eastern part, Western Highlands, E rim of Mt Oga, c. 12 miles E of Mt Hagen station, *Pullen 127* (CANB); Mt Hagen, S slopes, 3350 m, *Robbins 306* (CANB); Upper Minj R. valley, on the Minj-Nona divide, 3410 m, *Pullen 230*, in alpine thickets. Eastern Highlands, Kubor Ra., Mt Kinkain, 3410 m, *Saunders 724*; Mt Otto, 3400 m, *Brass 30981*; Mt Wilhelm, 3000 m, *Brass 30541*; Mt Michael, 3000 m, *Brass & Collins 31308*.

### 46. *R. leptanthum* F. v. M.

NEW GUINEA. Eastern part, Morobe Distr., Kaindi (= Wau), 2000 m, *Brass 29523*, terrestrial in mossy Castanopsis forest; *ibid.*, 2250 m, *Brass 29673*, epiphytic on Nothofagus. Milne Bay Distr., Mt Garatun, 1370 m, *Cruttwell 1014*.

### 51. *R. konori* Becc.

NEW GUINEA. Central part, Sibil R. valley, Betabib, 1300 m, *Hünneke 1*. Eastern part, Eastern Highlands, Chimbu, *Womersley s.n.* (LAE). Morobe Distr., Edie Creek above Wau, 2135 m, *N. G. F. 11827 Womersley*. Yunzaing (Sattelberg), 1220—1525 m, *Clemens 2727* (G).

### 67. *R. durionifolium* Becc.

BORNEO. Brunei, G. Pagon ridge, 1525—1675 m, *Ashton BRUN 1046*, 2278, 2302, in elfin woodland.

69. *R. apoanum* Stein, *Gartenflora* 34, 1885, 55, 194, t. 1196; *Jahresber. Schles. Ges. Vaterl. Cult. f. d. Jahr 1885* (1886), 414, 416.

The citation "Verh. Schles. Ges. vaterl. Cult. Breslau 1883" given in the author's revision on p. 99 does not exist. Dr. Schadenberg collected the original plant as a shrub of c. 0,5 m height on Mt Apo at c. 3000 m.

70. *R. malayanum* Jackvar. *malayanum*

BORNEO. Eastern part, W. Kutei, Mt Palimasan near Tabang on Belajan R., 800 m, *Kostermans 12931*, treelet, 1 m, common in mossy forest on sand.

var. *pilosifilum* Sleum.

BORNEO. North Borneo, Mt Kinabalu, Janet's Halt, new route, 2440 m, *Collettette 555*, fl. orange red.

var. *axillare* J. J. S.

BORNEO. Brunei, Batu Ketam, Ulu Ingei, 260 m, *Ashton BRUN 5607*, in extreme heath (kerangas) forest on hard sandstone ridge. Bt. Sagan, 550 m, *Hasan BRUN 3117*, in heath forest on knife edge hard sandstone ridge.

74. *R. lineare* Merr.

BORNEO. Sarawak, Limbang, Sagan Ra., on exposed edge at 365 m, *Brunig SA 165*. Bintulu, Merurong plateau, 730 m, *Brunig S 8900*.

76. *R. variolosum* Becc.var. *andersonii* (Ridl.) Sleum.

BORNEO. North Borneo, Mt Kinabalu, above Kambaranga, 2440 m, *Smythies 10618*, corolla lemon yellow at base, lobes vermilion; *ibid.*, Janet's Halt, new route, 2440 m, *Collettette 556*, corolla tube yellow, lobes orange red.

83. *R. yelliotii* Warb.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Wilhelm, 3560 m, *Brass 29828*, common.

91. *R. versteegii* J. J. S.

NEW GUINEA. Southwestern part, Mt Carstensz, Carstenszweide, *Dozy s.n.*, in ericoid vegetation on peaty soil, common.

92. *R. multinervium* Sleum.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Otto, 2000 m, *Brass 31069*; Mt Michael, 2000 m, *Brass 31466*.

95. *R. stapfianum* Hemsl. ex Prain

BORNEO. Eastern part, K. Kutei, Mt Palimasan, near Tabang on Belajan R., 800 m, *Kostermans 12963*.

97. *R. toverenae* F. v. M.; *Gartenflora* 34, 1885, 54.

NEW GUINEA. Southeastern part, Milne Bay Distr., Mt Garatun (Maneau Ra.), 1465 m, *Cruttwell & Otavi 1010* (K), fl. 4-7-1959, epiphytic shrub, c. 3.5 m, hanging from a large tree. Fergusson Isl., South coast, mountains between Agamoia and Ailuluai, 950 m, *Brass 27058*, in mossy forest on ridge crest (mentioned in the above cited revision sub 51. *R. konori* Becc., but the immature fruits of c. 7 by 1.7 cm and their style of c. 11 cm length point to *R. toverenae*).

The rediscovery of *R. toverenae*, which has the largest corollas of any species in the genus — Asiatic species have corollas up to 10 cm in length only — has made it possible to precise its systematic position. The species of which one flower was known up to now, has been put tentatively into the Subsect. *Solenovireya* by the author before, but the leaves now available point



to Subsect. *Phaeovireya*. *R. schlechteri* Laut., certainly much related to both *R. konori* Becc. and *R. toverenae* F. v. M. also is better placed in Subsect. *Phaeovireya*, in which these three species form a natural group.

99a. *R. macrosiphon* Sleum., nov. spec. — Frutex subscandens, c. 4 m altus. Ramuli robusti, ad internodia ultima (6—9 cm longa) 4—5, ad internodia inferiora (certe 10 cm longa) c. 8 mm diam., pruinosi, caduce lepidoti. Folia in pseudoveriticillis 4—5-meris ad nodos ultimos disposita, obovato-elliptica, apicem versus late vel latissime attenuata, apice ipso breviter vel brevissime apiculata, vel obtusa vel rarius subrotundata, basi in petiolum cuneata parumque decurrentia, valde coriacea, rigida, iis *R. scabridibractei* forma et nervatione similia, maturitate supra glabra, subtus dense lepidota (lepidibus minutis, in zona marginali hyalina cito caduca varie stellato-dentatis, centro crasso sat parvo profunde impressis), integra,  $\pm$  plana, 7—10 cm longa, (4—)4,5—6 cm lata, costa supra anguste impressa, subtus inferne petioli crassitudine, obtusa valdeque prominente, superne sensim decrescente, nervis lateralibus utroque latere 6—7 irregularibus, brevioribus intercalaribus seu venis conspicuis intermixtis, varie patentibus et anastomosantibus, supra in foliis maturis bene impressis, subtus prominula vel interdum subinconspicua; petioli robusti, semiteretes, supra sulcati, initio dense lepidoti, (2—)2,5 cm longi, c. 3 mm diam. Umbellae, ut videtur, 8—10-florae. Perulae exteriores haud visae, interiores elongato-spathulatae, utrinque pilis sat longis subappressis hirsutulae, usque ad 3 cm longae. Bracteolae lineares, glabrae, usque ad 2,5 cm longae. Pedicelli densissime lepidoti, (4—)5—8 mm longi,  $\pm$  1,5 mm crassi. Calyx oblique discoideus, irregulariter 5-lobulatus, dorso dense lepidotus, 5—6 mm diam. Corolla inferne tubulosa, ad lobos sat abrupte expansa, alba, extus ad tubum et medianam loborum partem subdense vel laxius stellato-lepidota, intus ad tubum dense pilis appressis albidis retrorsis c. 1 mm longis hirsuta, ceterum glabra, tubo 6—7 cm longo, e basi c. 5 mm diam. sensim sursum dilatato, infra lobos 1—1,5 cm diam., lobis subspathulato-obovatis vel suborbicularibus 2,5—3 cm longis, 2,5(—)3 cm latis. Stamina 10, e fauce corollae per 1—1,5 cm exserta; filamenta inferne linearia (1 mm) denseque pilis retrorsis induta, superne angustiora laxiusque pilosa, per c. 1,5 cm ultima filiformia et glabra; antherae elongato-oblongae, in vivo aurantiaco-brunneae, 7—8 mm longae, 1,5 mm diam., thecis basi in appendicem c. 1 mm longam angustatis, appendicibus  $\pm$  divergentibus. Discus crassus, 10-lobus, ad lobos densius, inter lobos laxius pilosus. Ovarium crasse cylindricum, sub anthesi c. 1,5 cm longum et 0,3—0,35 cm diam., flavido-hirsutum (pilis antrorsis lepides omnino tegentibus resp. occultantibus), sensim in stylum abiens, stylo inferne 1,5—2 m crasso, apicem versus gradatim decrescente, in parte apicali glabra c. 0,5 mm diam., toto 5,5—6 cm longo, in inferiore 2/3 parte hirsuto, superne laxius piloso et  $\pm$  caduce laxequle lepidoto, per centimetrum ultimum glabro; stigma capitatum, c. 2 mm diam., lobis crassis. Capsula nondum cognita.

NEW GUINEA. Central part, Star Mts, 1 km E of the mouth of the Minam R. into the Bon R., 1500 m, *Kalkman 4353* (L, type), fl. 2-7-1959, in a depression on peaty ground in the primary forest, rather common.

Related to *R. carringtoniae* F. v. M. and *R. carstensense* Wernh. which show a similar appendix at the base of each theca, different from both of them

by the corolla tube which is gradually dilated upwards, and by much larger corolla lobes.

100. **R. maius** (J. J. S.) Sleum.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Wilhelm, 2770—2800 m, *Brass* 30228, 30566 (infl. c. 5-flowered only).

103. **R. pleianthum** Sleum.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Otto, S slopes, 3260 m, *Brass* 30971; Mt Wilhelm, E slopes, on a high bank of Pengalagi Creek, 2700 m, *Brass* 30515.

107a. **R. rhodoleucum** Sleum., spec. nov. — Frutex (1—)1,5—3(—4) m altus, ramorum apicibus valde ramosis. Ramuli sat robusti, ad internodia ultima 3—5 cm longa et  $\pm$  2 mm diam. laxe caduce lepidoti, ad internodia inferiora usque ad 9 cm longa et 3—4 mm diam. glabrati, tenuiter albido-cinerascenti-corticati saepiusque laxe pustulis ellipticis fungi cuiusdam nigri forma lenticellorum adpersi. Folia in pseudoverticillis 4—6-meris ad nodos ultimos vel rarius etiam penultimos disposita, (late) elliptica vel subobovato-elliptica, (sub) sessilia, apice breviter late attenuata, apice ipso brevissime subacuminato obtusa, vel rarius subrotundata, basi  $\pm$  profunde cordata, coriacea, maturitate supra glabra et lucida, subtus sublucida laxequae lepidota (lepidibus planis, sat parvis, in zona marginali tenui sat lata varie dentatis vel angulatis, centro parvo leviter immerso), integra, plana, (3—)4—7 cm longa, (2—)2,5—5(—6) cm lata, costa supra inferne anguste impressa vel omnino plana, subtus inferne petioli crassitudine, applanata parumque prominente, sursum decrescente, nervis lateralibus utroque latere irregularibus 6—8, patentibus, venis similibus paucis interpositis, varie ramosis et anastomosantibus, utrinque conspicue prominentibus, reticulatione sat densa utrinque  $\pm$  prominula; petioli 0—1 mm longi et lati. Umbellae (4—)5—6-florae. Perulae haud cognitae. Bracteolae fere filiformes, usque ad 1 cm long. visae. Pedicelli crassiusculi, subdense vel laxe stellato-lepidoti, epilosi,  $\pm$  1,5 cm longi. Calyx valde oblique discoideus, indistincte 5-lobus, 2,5—3 mm diam., dorso inferne lepidotus, superne glaber. Corolla tubulosa, subrecta vel parum curvata, tota (7—)8—9 cm longa, extus ad tubum laxe lepidota, intus inferne dense, superne laxius pilis subpatentibus vel retrorsis induta, ad lobos utrinque  $\pm$  glabra, ad tubi basin rubra, per tubum rosaceo- vel salmoneo-suffusa, ad lobos alba, tubo 6—7(—7,5) cm longo, basi 4—5 mm diam., sursum sensim dilatato, infra lobos c. 1 cm diam., lobis  $\pm$  patentibus obovatis usque subrotundatis 1,5—2 cm longis et latis. Stamina 10, e fauce corollae parum exserta; filamenta inferne linearia (c. 1,2 mm) et subdense, superne angustiora et laxius subpatenti-pilosa, in summo  $\frac{1}{4}$  parte glabra; antherae flavidae, anguste oblongae, 3,5—4 mm longae, c. 1 mm latae, basi obtusae. Discus in margine superiore tantum pilosus. Ovarium subcylindricum, 7—8 mm longum, 2 mm diam., dense appresse pilosum et lepidotum, sensim in stylum abiens, stylo sat gracili, antheras paullo superante, in inferiore c.  $\frac{2}{3}$  parte densius usque laxius piloso laxequae lepidoto, superne per 3—4 mm sparse lepidoto et epiloso, in superiore tertia parte omnino glabro; stigma crasse turbinatum, breviter 5-lobum. Capsula nondum cognita.

NEW GUINEA. Southeastern part, Milne Bay Distr., Maneau Ra., Mt Aniata, c. 2750 m, *Cruttwell* 1084 (K, type), locally common, fl. 9-7-59; Mt Donana, c. 2290 m, *Cruttwell* 936 (K), fl. 10-10-57; Maneau Peak, 2750 m, *Brass* 22276 (A, L), fl. 19-5-53, common on edges of stunted mossy forest.

*Cruttwell* 936 was treated in my revision as slightly different from *R. tuba*, but the colour slides of the Rev. N. E. G. Cruttwell have convinced me, that *R. tuba* and *R. rhodoleucum* must be treated as distinct taxa. *R. tuba*, however, now appears to be intermediate in many respects between *R. carringtoniae* and *R. rhodoleucum*, and might be a local natural hybrid. All three species occur within the Maneau Ra.

111a. *R. retrorsipilum* Sleum., nov. spec. — Frutex epiphyticus. Ramuli sat graciles, c. 2 mm diam., initio subdense lepidoti, citissime glabrati et cinerascenti-corticati; internodia 3—4 ultima (1—)2—4 cm longi, inferiora vix longiora. Folia ad nodos ultimos vel penultimos in pseudoverticillis c. 3-meris disposita, elliptica, apice basique late obtuse attenuata vel saepius subrotundata, coriacea, in sicco supra olivacea, subtus pallidiora, initio utrinque subdense lepidota, maturitate supra quam subtus citius glabrescentia (lepidibus singulis tuberculo epidermali initio minuto vel plerumque minutissimo, denique  $\pm$  evanescenti impositis, minutis, in zona marginali profunde stellato-incisis, centro parvo, in pedem brevem extenuato), integra, in ipso margine vix recurvata, 4—6,5 cm longa, 2,5—4,2 cm lata, costa supra angustissime impressa, subtus inferne petioli crassitudine obtuseque prominente, longitudinaliter striata, sursum gradatim diminuta, nervis lateralibus utroque latere c. 5 patentibus, sat strictis, supra levissime vel haud immersis, subtus parum elevatis, reticulatione nulla; petioli 6—8(—10) mm longi, 1—1,5 mm crassi. Gemmae floriferae ovoideo-oblongoideae, 2,3 cm longae et 0,8 cm diam., perulis exterioribus ovatis vix 4 mm longis, interioribus sensim maioribus, ovato-oblongis, usque ad 1,5 cm longis, dorso imprimis superne subdense lepidibus sessilibus obsitis, fimbriatis. Umbellae c. 6-florae, in omnibus partibus exterioribus glabrae. Pedicelli sat graciles, 5—8 mm longi. Bracteolae lineares, usque ad 1 cm longae. Calyx subobliquis, discoideus, c. 2,5 mm diam., irregulariter 5-lobatus, lobis late deltoideis subacutis, sat longe albedo-fimbriatis, sub anthesi  $\pm$  reflexis. Corolla hypocrateriformis, alba, tubo 2—2,3 cm longo, c. 0,3 cm diam., intus fere usque ad orem subdense pilis retrorsis induto, lobis anguste spathulatis  $\pm$  horizontaliter patentibus 8—10 mm longis et 3—4 mm latis. Stamina 10, breviora e corollae tubo paullo, longiora valde exserta, longissima c. 3,5 cm longa; filamenta filiformia, fere usque ad apicem dense pilis  $\pm$  retrorsis albis instructa; antherae anguste oblongae, 3 mm longae, c. 0,7 mm diam., thecis basi subapiculato-protractis, obtusis. Discus parum prominens, ipsa basi glaber, superne pilosus. Ovarium elongato-cylindricum, dense pilis adpressis prorsus versis lepidibusque (pilis fere omnino obtectis) indutum, 5—6 mm longum, c. 1,5 mm diam., sensim in stylum abiens, stylo gracili, longitudine corollae tubum paullo superante, inferne dense, superne laxius piloso et distinctius lepidoto, infra stigma capitatum 5-lobum glabro. Capsula nondum cognita.

NEW GUINEA. Northeastern part, Morobe Distr., in the range above Markham point near Lae, at c. 900 m, *N. G. F. 11906 Henty*, fl. 16-2-1960.

From the related *R. jasminiflorum* Hook. (confined to W. Malaysia) easily discernible by the much shorter corolla tube.

## 120. *R. loranthiflorum* Sleum.

NEW BRITAIN. Headwaters of Matabuna Creek, Talasea subdistr., 180 m, *N. G. F. 10978 White*, fl. white 2-5-1959, epiphyte in high rainforest.

Formerly only known from Bougainville.



120a. **R. rhodosalpinx** Sleum., nov. spec. — Frutex. Ramuli sat graciles, c. 2 mm diam., internodiis ultimis dense lepidotis; internodia 1—2(—4) cm longa. Folia in pseudoveriticillis (3—)4-meris ad nodos 2(—3) ultimos disposita, elliptica vel subobovato-elliptica, apice late attenuata et obtusa vel subrotundata, interdum levissime retusa, basi late in petiolum attenuata vel subcuneata, coriacea, firma, supra in sicco olivacea et nitentia, subtus brunnescentia et opaca, supra maturitate glabra, subtus subdense lepidota (lepidibus parvis, in zona marginali substellato-dentatis, centro parvo bene immerso), integra, margine distincte revoluta, (3—)4—5 cm longa, (1,5—)1,8—2,6 cm lata, costa supra angustissime impressa, subtus inferne petioli crassitudine valdeque obtuse elevata, superne sensim diminuta, nervis lateralibus utroque latere c. 3-paribus subtus tantum parce prominulis, saepius omnino obscuris, reticulatione nulla; petioli paullo applanati, supra sulcati, lepidoti, 4—6 mm longi, 1 mm crassi. Umbellae 3-florae; perulae haud visae. Pedicelli subdense lepidoti, minutissime (sub lente) patenter-puberuli, 1,7—2,1 cm longi, c. 0,8 mm crassi. Bracteolae lineares, c. 1 cm longae. Calyx suboblique subcoideus, brevissime irregulariter 5-lobus, c. 2,5 mm diam., dorso lepidotus. Corolla hypocrateriformis, ut videtur, rubra, extus ad tubum et loborum inferiorem partem subdense substellato-lepidota, intus ad tubum inferne laxe pilosa, superne glabra, tubo recto, 3—3,5 cm longo, inferne (3—)4, infra lobos 5—6(—7) mm diam., lobis  $\pm$  patentibus obovatis 1—1,2 cm longis, c. 0,8 cm latis. Stamina 10, corollam aequantia vel partim superantia; filamenta anguste linearia, in inferiore media parte laxe patenter pilosa, superne glabra; antherae anguste oblongae, basi obtusae, 2,5 mm longae, 1 mm diam. Discus glaber. Ovarium subcylindricum, lepidibus marginalibus sese tegentibus vel certe partim attingentibus omnino tectum ut videtur epilosum (pilis brevissimis possibiliter in ovario proprio obviis lepidibus tectis), c. 6 mm longum, 1,7 mm diam., sursum sensim in stylum subgracilem corollam longitudine subaequantem abiens, stylo ipso in inferiore 1/3 parte laxe lepidoto, ceterum per c. 2/3 inferiorem partem laxe patenter brevipiloso, in summo tertio glabro, stigmate capitato brevissime 5-lobo. Capsula deest.

NEW GUINEA. Northern part, Swart R. valley, Kadubaka, 1600—2000 m, *D. Bergman* 815 (S, type), fl. 19-4-1958.

121. **R. anagalliflorum** Wernh.

NEW GUINEA. Eastern part, Eastern Highlands, S slopes of Mt Otto, 3470—3540 m, *Brass* 30999, in alpine grassland of the summit area.

122. **R. womersleyi** Sleum.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Wilhelm, E slopes, 3560 m, *Brass* 29810.

123. **R. gracilentum** F. v. M.

NEW GUINEA. Eastern part, Morobe Distr., Kaindi (= Wau), 2060 m, *Brass* 29683, 29745, 29746. Eastern Highlands, Mt Elandora, 2530 m, *Brass* 32140, epiphyte.

131. **R. coelorum** Wernh.

NEW GUINEA. Southeastern part, Mt Carstensz, 3600 m, *Dozy s.n.*, fl. red.

132. **R. saxifragoides** J. J. S.

NEW GUINEA. Southwestern part, Mt Carstensz, 'Dajakweide en Dajakpas', 4000—4200 m, *Dozy s.n.*, fl. dark red.

134. *R. stenophyllum* Hook. f.

BORNEO. Brunei, G. Pagon ridge, 1525 m, *Ashton BRUN 2334*, in moss forest on sandstone and shale ridge.

146a. *R. abietifolium* Sleum., nov. sp. — Frutex parvus. Ramuli graciles, glabri, nitiduli, in sicco longitudinaliter striati; internodia ultima 1—2 cm longa. Folia 8—10(—12) ad apicem internodiorum summorum 2 vel 3 per 2—3 mm aggregata, fere pseudoverticillata, linearia, apice brevissime apiculata vel obtusa, interdum minute retusa, basi in petiolum attenuata, coriacea, sat rigida, supra virescentia, nitida et glabra, subtus pallidiora laxequle lepidota (lepidibus sat magnis, in zona marginali angustissime plicatula varie stellato-dentatis vel divisis, centro saturatiore sat parvo vix impresso), usque ad costam revoluta, integra, margine leviter undulata, 2—2,5 cm longa, in statu revoluta aequaliter 1,5—2 mm lata, costa supra profunde sulcata, subtus inter margines laminae revolutae crasse prominente, nervis venisque nullis; petioli graciles, laxe lepidoti, applanati, 2—3 mm longi. Umbellae 2—3-florae. Perulae ovato-oblongae, breviter acuminatae, caduce lepidoto-fimbriatae, dorso glabrae, 6—10 mm longae, 3—4 mm latae. Bracteolae lineares, glabrae, apice varie incisae,  $\pm$  1 cm longae, 0,5 mm latae. Pedicelli graciles, dense patenter longepilosi, elepidoti, sub anthesi 1—1,5 cm longi. Calyx patellaris, vix 5-lobus, undulatus et  $\pm$  reflexus, dorso pilosus, c. 1,8 mm diam. Corolla inferne late tubulosa, superne subcampanulato-ampliata, in vivo brunnescenti-rubra, in sicco ad lobos intense carminia, ad tubum pallidior, tota 2,5—2,8 cm longa, extus ad tubum sicut pedicelli subdense pilis mollibus albescentibus patentibus induta et elepidota, ad lobos pilosa et sparse lepidota, intus glabra, tubo 1,5—1,8 cm longo, basi leviter 5-saccato, inferne c. 4, ad loborum basin c. 10 mm diam., lobis late obovato-spathulatis  $\pm$  1 cm longis et 0,6—0,8 cm latis. Stamina 10, dimidium corollae subaequantia; filamenta linearia, ad  $\frac{1}{4}$ — $\frac{1}{3}$  infer. partem patenter pilosa, superne glabra; antherae late oblongae, 2—2,5 mm longae, 1 mm latae, thecis basi apiculo vel glandula rubra minuta instructis. Discus prominens, glaber. Ovarium subconico-cylindricum, dense subadpresse albidopilosum, caduce lepidotum, c. 3 mm longum, 1,5 mm crassum, cum stylo subabruptum, stylo ipso gracili, glaberrimo, c. 1,3 cm longo, stigmate breviter turbinato. Capsula submatura crasse obovoideo-cylindrica, dense breviter pilosa, laxequle lepidota, c. 1,2 cm longa, 4 mm diam., pedicello  $\pm$  2 cm longo et fere 1 mm crasso.

BORNEO. North Borneo, Mt Kinabalu, new route, c. 3200 m, *S. Collenette 602* (L, type), fl. Dec. 1960, rather frequent locally; *ibid.*, *Collenette s.n.* (L), fr. Aug. 1960.

Rather isolated within the Ser. Buxifolia both by leaf and floral characters.

147. *R. nieuwenhuisii* J. J. S.

BORNEO. Brunei, Ulu Medamit, Limbang R., c. 100 m, *Smythies BRUN 3195*, epiphyte by river.

148a. *R. sheilae* Sleum., spec. nov. — Frutex terrestris usque ad 1,8 m altus, distaliter divaricato-ramosus. Ramuli graciles, ad partes novellas dense lepidoti, deorsum cito glabrescentes; internodia 1—3(—4) cm longa, ultima 1,5—2 mm diam. Folia in pseudoverticillis (4—)5—8(—10)-meris ad nodos 2—3 ultimos disposita, oblanceolata vel obovato- vel elliptico-oblonga, apicem versus late attenuata, apice ipso obtusa, rarius subrotundata, interdum levissime

retusa, basin versus in petiolum cuneata, coriacea, erecto-patentia, supra caduce lepidota, aetate glabra et nitentia, subtus sat laxe persistenter lepidota (lepidibus parvis, in zona marginali sat angusta citoque dissoluta varie dentata vel angulata, centro minuto parum sed distincte impresso), per totam marginem regulariter minute crenulata, 1,5—2,5 (raro usque ad 3,5) cm longa, (0,4—) 0,6—1 (raro usque ad 1,3) cm lata, costa supra per totam longitudinem impressa, subtus valde obtuseque prominente, nervis 4—5-paribus parum conspicuis, in foliis maturis interdum supra levissime impressis, saepius subtus tantum prominulis, vel haud raro utrinque obsolete; petioli crassi, dense lepidoti, (1—) 2—3 mm longi, c. 1 mm diam. Umbellae (3—)4—6-florae. Perulae haud visae. Bracteolae subfiliformes, glabrae, c. 8 mm longae. Pedicelli crassiusculi, sicut calyx sat dense patenter brevipilosi laxiusque et  $\pm$  caduce lepidoti, 1,2—1,8 cm longi. Calyx oblique patellaris, subobscur 5-lobus vel -undatus, c. 3 mm diam. Corolla  $\pm$  infundibuliformis, inferne late tubulosa, lobos versus dilatata, ad lobos patens,  $\pm$  saturate purpurea, extus ad tubum et loborum basin subdense vel laxius lepidota breviterque albedo-pilosa, intus in inferiore tubi parte laxe pilosula, ceterum glabra, tota 2,5—3 cm longa, tubo  $\pm$  1,5 cm longo, in inferiore dimidio  $\pm$  cylindrico et 4—6 mm diam., sursum sensim usque ad 9—10 mm diam. dilatato, lobis late obovatis 1—1,3 cm longis,  $\pm$  1 cm latis. Stamina 10, subaequilonga, dimidium loborum aequantia; filamenta linearia, inferne paullo dilatata laxequae pilosa, per  $\frac{2}{3}$  partem superiorem glabra; antherae late oblongae, c. 2,5 mm longae, 1 mm latae, thecis basi  $\pm$  distincte apiculato-protractis. Discus prominens, ad marginem superiorem tantum pilosus. Ovarium conico-cylindricum, 3—4 mm longum, 2—2,5 mm diam., dense albidopilosum laxiusque (imprimis superne) lepidibus parvis subrotundis denique  $\pm$  caducis indutum, cum stylo abruptum. Stylus crassiusculus, e tubo corollae vix exsertus, glaberrimus; stigma crasse turbinatum, brevissime 5-lobum. Capsula submatura cylindrica, subdense pilosa et lepidota, c. 1,2 cm longa, 3 mm diam.

BORNEO. North Borneo, Mt Kinabalu, new route, just below the summit at c. 3670 m, *Sheila Collett* 581 (L, type), 582, fl. 8-8-1960; *ibid.*, *Collett* s.n. (L), fr. juv. Dec. 1960.

Related to both *R. pseudobuxifolium* Sleum. (Celebes) and *R. commonae* Foerster (New Guinea), but different by the lepidote and hairy corolla. There are 2 possibly constant forms to be found on or near the summit, the one with narrower, oblanceolate to obovate-oblong leaves ( $\pm$  1,5 by  $\pm$  0,5 cm), the other with larger, obovate to elliptic-oblong leaves (2—3,5 by 0,8—1,3 cm), both present in the above cited two collections.

153a. **R. vandeursenii** Sleum., nov. spec. — Frutex erectus epiphyticus, usque ad 1 m altus, internodiis ultimis  $\pm$  dense lepidotis, inferioribus glabris sat laevibus; internodia ultima 0,5—5(—6) cm longa, sat gracilia. Folia in pseudoverticillis 3—4-meris ad nodos 2(—3) ultimos disposita, obovata vel elliptico-obovata, apice rotundata, interdum levissime retusa, basi in petiolum cuneata vix decurrentia, supra  $\pm$  convexa, coriacea, novella utrinque laxe lepidota, matura supra glabra et nitidula, subtus dilutiora, opaca et subdense lepidota (lepidibus sat planis, in zona marginali hyalina cito dissoluta varie dentatis vel incisis, centro saepius crasso et diutius permanente, ut zona marginali  $\pm$  evanida lepides integrae esse videntur), integra, margine in sicco bene revoluta, (1,5—)2—3(—4) cm longa, (0,8—)1—1,8 cm lata, costa supra plana



vel subimmersa, haud raro subinconspicua, subtus crasse obtuse prominente, apicem laminae versus paullo decrescente, nervis lateralibus utroque latere c. 5 irregularibus supra cum venis subinconspicuis, subtus parum prominentibus, interdum fere obscuris, venulis obsoletis, reticulatione propria nulla; petioli initio lepidoti, 3—4(—5) mm longi, c. 1 mm crassi. Flores solitarii, rarius bini. Perulae in gemmis floriferis possibiliter haud plane evolutis tantum visae, late ovatae, subacuminato-apiculatae, ad medianam dorsalem carinatae denseque caduce lepidotae, manifeste fimbriatae, usque ad 6 mm longae et latae. Bracteolae haud visae. Pedicelli crassiusculi, 1,3—2,3 cm longi, laxe usque subdense stellato-lepidoti laxequae patenter pilosuli. Calyx  $\pm$  oblique discoideus, breviter subacute 5-lobus, 2,5—3,5 mm diam., lorso lepidotus. Corolla tubulosa, faucem versus subcampanulato-dilatata, tota 4,5—5(—5,5) cm longa, rubra, extus ad tubum vel certe in inferiore dimidio laxe stellato-lepidota et breviter albido-pilosa, ad lobos glabra, intus glabra vel pilis sparsis induta, tubo subrecto vel paullo curvato 3,5—4,3 cm longo, basi 4—5 mm diam., faucem versus sensim usque ad 1,2—1,5(—2) cm diam. dilatato, lobis erectis late subspathulato-obovatis vel subrotundatis 8—10 mm longis, 6—8 mm latis. Stamina 10, corollam longitudine  $\pm$  aequantia; filamenta linearia, omnino vel certe in inferiore dimidia parte glabra, interdum superne laxissime pilosa; antherae late oblongae usque subobovato-oblongae, 2,7—3 mm longae, c. 1 mm latae, basi obtusae. Discus inferne glaber, superne pilosus. Ovarium subcylindricum, dense pilis subpaucis lepidibusque intermixtis obtectum, 6—7 mm longum, 2 mm diam.; stylus cum ovario continuus, corollam subaequans, in tertio inferiore vel usque ad medium laxe subpatenter pilosulus, elepidotus, stigmatibus crasse turbato. Capsula nondum cognita.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Wilhelm, E slopes, Pengagl camp, 2770 m, *Brass* 30431 (A; L, type), epiphyte in mossy forest, fl. 10-7-1959 (*phot. Brass*); *ibid.*, 2600 m, *Brass* 30488, epiphyte in secondary growth. Western Highlands, Merimanta, Wabag subdistr., 2285 m, *N. G. F.* 11351 *Womersley*, fl. deep crimson 16-7-1959.

Named after Hobart M. Van Deu(r)sen, Assistant Curator, Archbold Expeditions, for his great interest in the genus.

157. ***R. pseudonitens*** Sleum., nom. nov. — *R. nitens* Sleum., Reinwardtia 5, 1960, 162, non Hutch., Gard. Chron. 99, 1936, 10; Spec. Rhodod. 2d ed., 1947, 594 A.

158. ***R. commonae*** Foerst. — (149) *R. stonori* Sleum.

Recently received ample material from various places in the Eastern Highlands breaks down the differences between these species as to the length of the calyx lobes. The specimens described as *R. stonori* with the short calyx lobes represent the normal state, whilst those cited from Mt Saruwaged, the type locality of *R. commonae*, with irregular, in part up to 8 mm long calyx lobes, are anomalous. Such differences in the size of the calyx lobes occur also in other species, rather often, for instance, in *R. konori* Becc. Other differences between *R. commonae* and *R. stonori* as the size and the form of the apex of the leaves now seem to be irrelevant.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Michael, 3290—3650 m, *Brass & Collins* 31276, plentiful in alpine grassland; *ibid.*, 3600 m, *N. G. F.* 11495 *Womersley*, on the crests of the highest ridges. Mt Wilhelm, 3390 m, *Brass* 30113, in alpine grassland.

165. *R. luteosquamatum* Sleum.

NEW GUINEA. Eastern part, Morobe Distr., Kaindi (= Wau), 2060 m, Brass 29647; *ibid.*, Edie Creek road, 1830 m, N. G. F. 10450 Womersley.

166. *R. inconspicuum* J. J. S.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Wilhelm, 2770 m, Brass 30415. Milne Bay Distr., Mt Patana (Maneau Ra.), 1180 m, Cruttwell 1021, 1022; *ibid.*, Yogom plateau, 2285 m, Cruttwell 1026.

173. *R. atropurpureum* Sleum.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Wilhelm, E slopes, 3650—3840 m, Brass 29862, 30104.

175. *R. wrightianum* Koord.var. *wrightianum*.

NEW GUINEA. Southeastern part, Milne Bay Distr., Mt Garatun (Maneau Ra.), 1370 m, Cruttwell 1013 (K).

177a. *R. calosanthes* Sleum., nov. spec. — Frutex c. 40 cm altus, erectus, ut videtur parum ramosus. Ramuli graciles, ad partes novellas laxè substellato-lepidoti, ad partes vetustiores cito glabrescentes, leaves, 1—2 mm diam.; internodia (1.5—)2—5 cm longa. Folia alterna, 4—6 in superiore internodiorum 2—3 ultimorum parte paullo distanter disposita, interdum pro parte (2 vel 3) coarctata vel pseudoverticillata, anguste oblonga vel oblongo-elliptica, apice subacute attenuata vel subacuminata, basi attenuata vel subcuneata, coriacea, initio utrinque laxè lepidota, aetate supra tarde glabrescentia, subtus subpersistentè lepidota (lepidibus mediocribus in zona marginali tenui variegata substellato-dentatis vel incis, centro minuto  $\pm$  impressis), anguste marginata, per totum marginem densius vel remotius lepidibus impressis subcrenulata, vel  $\pm$  integra, 2—2.5 cm longa, 0.5—0.9 cm lata, costa supra vix impressa vel plana, subtus inferne crasse obtuseque prominente, sursum decrescente, nervis venisque inconspicuis; petioli 2—3 mm longi, 0.7—1 mm lati. Flores solitarii vel plerumque bini, nutantes. Perulae membranaceae, in vivo rubrae, dorso glabrae et lucidae, haud fimbriatae, ovato-oblongae, exteriores acuminato-apiculatae, interiores obtusae, usque ad 2 cm longae et 1 cm latae. Bracteolae haud visae. Pedicelli subgraciles, dense stellato-lepidoti, haud papilloso vel pilosuli, sub anthesi 1.5—2 cm longi. Calyx oblique discoideus, saepius corollae basali saccata parte  $\pm$  inclusus, vix lobatus,  $\pm$  2.5 mm diam., dorso lepidotus. Corolla inferne tubulosa, orem versus gradatim paullo ampliata, parum zygomorpha, rubra vel ignea, tenera, extus ad tubum laxè substellato-lepidota, intus omnino glabra, tota 3(—3.5) cm longa, tubo recto 2(—2.5) cm longo, ad basin 5—6, ad faucem 8—10 mm diam., lobis erecto-patentibus late obovato-oblongis  $\pm$  1 cm longis et (0.5—)0.6—0.8 cm latis. Stamina 10, valde inaequilonga, longissima vix e corolla tubo exserta; filamenta linearia, glabra; antherae obovato-oblongae, basi obtusae, 1.5—1.8 mm longae, 1 mm latae. Discus prominens, glaber. Ovarium suboblique cylindricum, 4 mm longum, 1.5 mm crassum, dense lepidibus substellatis ferrugineis obtectum, epilosum, sensim in stylum rubrum gracilem basi lepidotum, ceterum omnino glabrum, 1—1.4 cm longum abiens, stigmate turbinato breviter 5-loba. Capsula deest.

NEW GUINEA. Central part, Star Mts, Mt Antares, 3000—3200 m, Kalkman 4483, 4542 (L, type), fl. 23/27-7-1959, rare in alpine or semialpine shrub vegetation.

Certainly related to *R. rubrobracteatum* Sleum., different however by smaller leaves and the larger corolla.

178. *R. verticillatum* Low ex Lindl.

f. *verticillatum*

BORNEO. Sarawak, Batu Eklap, Merurong plateau, 1035 m, *Brunig SK 340*.

179a. *R. keditii* Sleum., nov. spec. — Frutex terrestris. Ramuli robusti, internodiis 1,5—3 cm longis, 0,3—0,5 cm diam., subglabris. Folia in pseudoverticillis 3—4-meris ad nodos ultimos, rarius etiam penultimos disposita, oblonga vel oblongo-elliptica, rarius subobovato-elliptica, apice breviter attenuata vel subacuminata,  $\pm$  obtusa, basi latissime attenuata vel rotundata, coriacea, firma, supra maturitate glabra, in sicco pallide viridia, subtus brunnescentia subdenseque lepidota (lepidibus minutis, in zona marginali tenera citoque dissoluta varie dentatis, centro parvo bene impresso), integra, in sicco supra parum convexa, 6,5—10,5 cm longa, (2—)3—6 cm lata, costa inferne petioli latitudine, superne sensim angustata, vel interdum evanescente, supra inferne elevata manifesteque canaliculata, superne plana vel leviter immersa, subtus inferne crasse, sursum minus alte prominente, apicem laminae versus  $\pm$  applanata, nervis lateralibus utroque latere 6—8 irregularibus, inferne subrectis, marginem versus haud raro ramosis et anastomosantibus, supra in foliis bene maturis distincte immersis, subtus prominulis, reticulatione laxa, subtus tantum paullo elevata, vel subobscura; petioli semiteretes vel applanati, rugulosi, in vivo rubescentes, glabri, (1—)1,2—1,6 cm longi, (3—)4—5 mm lati, 2—3 mm crassi. Gemmae floriferae ovoideo-subglobosae, 2(—2,5) cm longi et 1,5—2 cm lati; perulae exteriores chartaceae, ovato-subrotundatae, distincte apiculatae, interiores maiores et tenuiores, late ovato-ellipticae, brevissime apiculatae, intimae oblongo-obovatae, obtusae, dorso subrugulosae, glabrae, nitidae, haud fimbriatae, 1—2 (raro 2,5) cm longae et 1—1,5 cm latae. Umbellae c. 10-florae. Bracteolae inferne lineares, superne elongato-subspathulatae, glabrae, 1—1,5 cm longae, apice 2—3 mm latae. Pedicelli sat graciles, in vivo rubri, dense brevissime patenti-pilosi, praecipue infra calycem laxe lepidoti, sub anthesi 1,6—2,2(—2,5) cm longi. Calyx patellaris,  $\pm$  obliquus, indistincte 5-lobus, dorso puberulus laxissimeque lepidotus, 2,5—3 mm diam. Corolla late infundibuliformis, saturante rosea, extus ad tubum et inferiorum lorum partem subdense vel laxius breviter albidopilosa, laxissime vel haud lepidota, intus in inferiore tertio tubi pilosula, ceterum glabra, tota 3—3,5 cm longa, tubo basi parum saccato et 4—5 mm diam., sursum sensim dilatato, ad lorum basin 1—1,3(—1,5) cm diam., ad limbum c. 2,5 cm diam., lobis subrectis vel subpatentibus,  $\pm$  obovatis, 1—1,5 cm longis, 1—1,3 cm latis. Stamina 10, ex tubo corollae paullo exserta; filamenta inferne linearia denseque brevissime pubescentia, in superiore  $\frac{2}{3}$  parte angustata et glabra; antherae late subobovato-oblongae, 2,5—3 cm longae, 1 mm latae, thecis basi parum angustatae, obtusae. Discus prominens, manifeste 10-lobus, glaber. Ovarium subconico-cylindricum, dense breviter pilosum, ut videtur haud (vel caducissime) lepidotum, sat abrupte in stylum attenuatum, 4—5 mm longum, 2—2,5 mm diam.; stylus crassiusculus, glaberrimus, 7—8 mm longus, stigmatibus turbinatis. Capsula submatura subcylindrica, laxe pubescens et latissime lepidota, c. 2 cm longa, c. 6 mm diam., pedicello 2,5—3,5 cm longo, et 1—1,3 mm crasso.



BORNEO. North Borneo, Mt Kinabalu, Mesilau R., East Pinosok Plateau, 1920 m, *S. Collettette (and Kedit)* 570 (L, type), fl. 7-8-1960; *ibid.*, *Collettette (and Kedit)* s.n. (L), fr. Dec. 1960.

Within the species of the Javanicum-group with hairy corollas apparently related to *R. rugosum* Low ex Hook. which however has  $\pm$  bullate leaves and deeply stellate, subdendroid scales. The leaves are similar to those of *R. crassifolium* Stapf. whose midrib, however, is more convex-prominent and not canaliculate above, and  $\pm$  flattish beneath.

180. *R. christi* Foerster.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Elandora, 2530 m, *Brass & Collins* 32134.

182. *R. villosulum* J. J. S.

NEW GUINEA. Eastern part, Eastern Highlands, Mt Wilhelm, E slopes, 2770 m, *Brass* 30424.

206. *R. crassifolium* Stapf.

BORNEO. Sarawak, Marigan R., 1220 m, *Brunig* s.n. Brunei, G. Pagon ridge, 1675 m, *Ashton BRUN* 1061, 2295, 2317, 2318, 2367, in elfin woodland.

211. *R. wentianum* Koord.

NEW GUINEA. Central part, Star Mts, 1 km E of the mouth of the Minam R. into the Bon R., 1500 m, *Kalkman* 4400, epiphyte.

219. *R. macgregoriae* F. v. M.

var. *macgregoriae*

NEW GUINEA. Northwestern part, Kebar valley, Pinek Mts, c. 800 m, *B.W.* 2333 *Mangold*, fl. light red, in second. forest on stony clay. Central part, Sibil valley, 1200 m, *Kalkman* 4147, in second. forest. Eastern part, Western Highlands, Merimanta, 2135 m, *N. G. F.* 11083 *Womersley*. Eastern Highlands, Lufa-Goroka road, 1830 m, *N. G. F.* 11735 *Womersley*; *ibid.*, 11736 *Womersley*, with corollas up to 4 cm, probably a local hybrid with another species of Ser. Javanica, possibly *R. zoelleri* Warb.; Arau, 1400 m, *Brass* 32044, on old second. grassland; Arau-Obura, 1520 m, *Brass* 32128; Mt Otto, 2200 m, *Brass* 30862, in second. forest; Mt Michael, N slopes, 1920 m, *Brass* 31149, in second. grassland. Morobe Distr., Edie Creek road, 1800 m, *N. G. F.* 11809 *Womersley & Hoogland*.

var. *glabrifilum* (J. J. S.) Sleum.

NEW GUINEA. Northern part, Sidoarsi Mts, c. 200 km W of Hollandia, 600 m, *B. W.* 8566 *Vink*, fl. pinkish red, in primary, tidally inundated forest on sand. Southern part, Mimika subdiv., Wamere-epere (Kokonao), *B. W.* 5153 *Warint*.

220. *R. orbiculatum* Ridl.

BORNEO. Sarawak, B. Rumah, 900 m, *Brunig* S 10667, fl. pinkish-white. Brunei, G. Pagon ridge, 1675 m, *Ashton BRUN* 1651, in elfinwoodland on rugged hill crest. Western part, Mt Glam, 500 m, *Langlassé* 66 (G), fl. white.

225. *R. longiflorum* Lindl.

var. *longiflorum*.

BORNEO. Brunei, Batu Retam, Ulu Ingei, c. 260 m, *Ashton BRUN* 5610, 5626, in extreme heath (kerangas) forest on hard sandstone ridge. Medamit R., c. 100 m, *Smythies BRUN* 3196, in primary forest by river. Ulu Supon, Tuton, *Ashton BRUN* 872. G. Pagon ridge, 1525 m, *Ashton BRUN* 1035, epiphyte in mossy forest. Bt. Retak, 1250 m, *Ashton BRUN* 2544, in montane forest (var.).

226. *R. christianae* Sleum.

NEW GUINEA. Southeastern part, Milne Bay Distr., Tua, Daga country, 1220 m, *Cruttwell 1102* (K), with umbels up to 5 flowers, corolla only 4 cm long, by  $\pm 1$  cm in diam.; anthers 3 mm only, otherwise quite in accordance with the type material.

A plant which apparently is a natural hybrid between *R. christianae* and *R. macgregoriae* was found by the Reverend N. E. G. Cruttwell (n. 1027, K) on the Yogom plateau (Maneau Ra.) at the base of Mt Aniata at 2285 m: leaves elliptic, shortly acuminate at the apex; umbels hemispherical, loosely many-flowered; pedicels stoutish, laxly lepidote and patent-puberulous,  $\pm 3$  cm; corolla of a delicate pale apricot pink with yellow throat, tube 2—2.5 by 0.5—0.6 cm, lobes suddenly spreading, 1—1.3 by 0.7—1 cm; stamens exserted; anthers 2 mm, the pollen quite normal; ovary grey-tomentellous, the hairs covering the scales; style subdensely to laxly hairy in the lower half.

228. *R. kochii* Stein, Gartenfl. 34, 1885, 55, 193, t. 1195; Jahresber. d. Schles. Ges. f. Vaterl. Cultur f. d. Jahr 1885, 1886, 413, 414.

PHILIPPINES. Mindanao, Mt Apo, Seriban Creek, 2000 m, *Schadenberg & Koch s.n.* (B, type, †; MA (Herb. Vidal), not seen).

Dr. E. Quisumbing, Manila, who has studied the Vidal Herbarium, has drawn my attention to the fact, that an isotype specimen of *R. kochii* still is preserved at Madrid. The neotype, based by the author on *Elmer 11435*, thus is superfluous.

The citation 'Verh. Schles. Ges. Vaterl. Cultur Breslau 1883' does not exist.

230. *R. aurigeranum* Sleum.

NEW GUINEA. Eastern part, Morobe Distr., Patep Creek, Lae-Bulolo road, 915 m, *Brass 29509, 29510*.

231. *R. scabridibracteum* Sleum.

NEW GUINEA. Central part, Star Mts, Mt Antares, 2360 m, *Brandenburg & Van den Gronden 1; Kalkman 4445*, rare in mossy forest. Eastern part, Western Highlands, Merimanta, N of Wabag, 2135 m, *N. G. F. 11066 Womersley*. Eastern Highlands, Mt Otto, 2400 m, *Brass 31119*; Purosa, Okapa area, 1950 m, *Brass 31683*.

232. *R. zoelleri* Warb.

NEW GUINEA. Northwestern part, Kebar valley, Bukusir Mts, 700 m, *B. W. 3282 Mangold*, in primary forest. Northern part, Sidoarsi Mts, c. 200 km W of Hollandia, c. 430 m, *B. W. 9273 Schram*, in primary forest on sandy clay. Eastern part, Eastern Highlands, Aiyura-Arona road, 1585 m, *Brass 32475*.

233. *R. maxwellii* Gibbs.

BORNEO. North Borneo, Mt Kinabalu, Janet's Halt, new route, 2800 m, *Collenette 550*, fl. pale salmon and yellow.

234. *R. nervulosum* Sleum.

BORNEO. North Borneo, Mt Kinabalu, on landslide above camp at Pinosok plateau, 1920 m, *Collenette 568*, fl. bright scarlet.

247. *R. culminicolum* F. v. M. var. *culminicolum*. — 241. *R. convexum* Sleum. — 245. *R. angiense* J. J. S. — 246. *R. keysseri* Foerster — 248. *R. gregarium* Sleum.

The above cited species are separated in the key of the author's revision (p. 183) mainly by the rather ambiguous characters of the corolla size and leaf shape. New material from the Western and Eastern Highlands has shown, that these species can be united under the one supposition, that the corolla length of *R. culminicolum* is rather variable, either in the wild state and/or at least in the herbarium specimens: slight pressing makes the corollas shrink considerably, while strong pressing conserves the original length and width of the corolla or even extends them. The leaves of specimens collected in high altitudes (2500—4000 m) are more coriaceous, subsessile and  $\pm$  rounded at the base.

NEW GUINEA. Western part, Mt Carstensz, 3700—4000 m, *Dozy s.n.* (filaments hairy; style hairy at the base only; pedicels exclusively scaly.) Eastern part, Western Highlands, Mt Kinkain, Central Kubor Ra., 3600 m, *Pullen 210a*. Eastern Highlands, Kubor Ra., Minj subdist., 3410 m, *Saunders 737*. Mt Wilhelm, 3560 m, *Brass 30040*. Mt Michael, 3600 m, *Brass & Collins 31279*, in alpine grassland.

253a. *R. intranervatum* Sleum., spec. nov. — Frutex epiphyticus. Ramuli valde crassi, glabri, in partibus novellis c. 4 mm diam.; internodia 1,5—3 cm longa. Folia ad apices nodorum ultimorum et penultimorum solitaria vel gemina subopposita, ad nodos inferiores, ut videtur, cito caduca, cicatrices subreniformes 5—6 mm longas et 7—9 mm latas praebentia, elliptico-obovata, apice rotundato-obtusa vel interdum brevissime apiculata, basin versus late subcuneato-attenuata, basi ipsa subtruncato-obtusa vel levissime cordata, coriacea, firma, supra maturitate  $\pm$  glabra, subtus subpersistenter sat laxe lepidota (lepidibus minutis planis, in zona marginali varie substellato-dentatis, centro parvo vix immerso), integra, siccitate margine parum revoluta, 13—16 cm longa, 8—10 cm lata, costa in vivo rubra, inferne petioli latitudine, sursum sensim angustata, supra inferne parum prominente, superne gradatim applanata, subtus inferne valde crasse prominente, apicem laminae versus sensim decrescente denique  $\pm$  evanescente, nervis lateralibus utroque latere 12—14(—16)  $\pm$  rectangulariter a costa abeuntibus, subrectis, inter sese  $\pm$  parallelis, pro parte profunde divis, aliis seu venis primariis subparallelis minus distinctis intercalaribus numerosioribus, omnibus utrinque  $\pm$  manifeste prominentibus, ante marginem anastomosantibus et in nervum interiorem intramarginalem crassum collectis, nervo altero exteriori simili multo minus distincto cum nervo interiore venulis numerosissimis transversis conjuncto, reticulatione utrinque densa et imprimis subtus laete prominula; petioli valde robusti, a dorso depressi vel subsemiteretes, glabri, c. 1 cm longi, 5—6 mm lati,  $\pm$  4 mm crassi. Flores bini. Perulae interiores tantum visae, oblongae, glabrae, 4—5 cm longae,  $\pm$  1 cm latae. Bracteolae (vel perulae intimae?) elongato-subspathulatae, c. 4 cm longae, usque ad 0,5 cm latae. Pedicelli robusti, densissime patenter brevipilosi, elepidoti, c. 4 cm longi, c. 1,5 mm diam. Calyx anomalus, glaber, in lacinias 5 elongatas corollae appressas obtusas 4—4,5 cm longas et 2—4 mm latas excrescens. Corolla infundibuliformis, dilute flava, intus per centimetrum basale brevissime pilosa, ceterum omnino glabra, usque ad medium 5-loba, tota 5 cm longa, ad basin leviter 5-saccatam c. 0,6, infra lobos 1,5—2 cm diam., lobis obovato-spathulatis erecto-patentibus c. 2,5 cm longis et  $\pm$  2 cm latis. Stamina 10, c. 3 cm longa; filamenta in inferiore dimidio linearia denseque pilosa vel subvillosa, superne filiformia et glabra; antherae anguste oblongae, parum curvatae, 8 mm longae, 1,5 mm latae, thecis basi gibbo obtuso sat manifesto praeditis.



Discus prominens, laxe pilosus. Ovarium subcylindricum, c. 6 mm longum, 2 mm diam., dense albido-pilosum vel subvillosum, ut videtur elepidotum, cum stylo continuum, stylo ipso subgracili glaberrimo 1 cm longo, stigmatibus crasse turbinatis. Capsula deest.

BORNEO. Eastern part, W. Kutei, Mt Palimasan near Tabang on Belajan R., 600 m, *Kostermans 12886* (BO; L, type), fl. 10-9-1956, in Agathis forest on waterlogging white acid sands.

Apparently related to *R. lowii* Hook. f., with which it shares the big, many-nerved leaves, but otherwise different in many characters, as for instance the few-flowered inflorescence, the hairy, elepidote pedicels, and longer anthers.

255. ***R. brookeanum*** Low ex Lindl. var. ***brookeanum***.

BORNEO. Sarawak, Bintulu, Sg. Jelalong, 30 m, *Brunig S 8898*. Bako Nat. Park; on rocks near sealevel, *Illias 10311*, fl. salmon; *ibid.*, Tg. Paku, *Brunig 7707*. Mt Santubong, rocky coast, *Corner & Brunig 10331*. Brunei, Medamit R., *Smythies BRUN 3194*. Bt. Briang, 550 m, *Nat. Coll. BRUN 3139*, a form with narrower leaves.

var. ***gracile*** (Low ex Lindl.) Sleum.

BORNEO. Sarawak, Mt Santubong, c. 300 m, *Smythies 9858, 9859*, fl. yellow, on vertical rock. Bukit Serapah near Kuching, on exposed limestone rock, *Brunig s.n.* Bako Nat. Park, on rocks behind mangrove, *Illias S 7712*. Brunei, Sg. Ingei, Ulu Belait, *Brunig s.n.*

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## MISCELLANEOUS BOTANICAL NOTES<sup>1)</sup>

by

C. G. G. J. VAN STEENIS

(Foundation Flora Malesiana, Leyden)

(Issued 1. XII. 1961)

### 72. The status of *Dysoxylum lasiocarpum* Miq. (Meliaceae)

Mr F. H. Hildebrand, who is going gradually through the tree species from New Guinea, pointed my attention to this species, the type of which is in the Rijksherbarium at Leyden (in fruiting state). It was collected by Zippelius who rightly recognized its alliance; he added a MS description and gave it the MS name *Epicharis lasiocarpa*. Miquel subsequently described it in the genus *Dysoxylum*, but the curved fern-like leaflet and other characters leave no doubt about its belonging to *Chisocheton*.

There are at Leyden two further collections of it from New Guinea, both made by Teysmann, HB 6058 and 6060.

*Chisocheton lasiocarpum* (Miq.) Hildebrand, comb. nov. — *Dysoxylum lasiocarpum* Miq. Ann. Mus. Bot. Lugd. Bat. 4 (1868) 13; C. DC. Mon. Phan. 1 (1878) 527; Bull. Herb. Boiss. III, 2 (1902) 168.

### 73. The identity of *Barringtonia ceramensis* R. Knuth

Mr F. H. Hildebrand showed me the type specimen of this species which is preserved in the Rijksherbarium, Leyden. It was described from the Moluccas by R. Knuth, Pfl. Reich Heft 105 (1939) 22.

It consists of a twig with long leaves and one loose fruit. It appears to be *Buchanania amboinensis* Miq. (*Anacardiaceae*) as far as the vegetative material is concerned. The loose fruit belongs to *Barringtonia*. As the type is based on entirely discordant elements the name of the species is to be discarded.

### 74. The identity of *Semecarpus* ? *fulvinervis* Bl. (*Anacardiaceae*)

This species was described by Blume, Mus. Bot. 1 (1850) 188, from Borneo. Blume put a question mark between generic name and epithet, as he was obviously in doubt of the generic disposition on account of the fact that the type material, preserved in the Rijksherbarium, Leyden, was only in the sterile state.

This doubt seems to be well founded, as it appeared to Mr F. H. Hildebrand

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<sup>1)</sup> The first paper in this series appeared in Bull. Bot. Gard. Btzg III, 17, 1948, 383—411; the 2nd in Blumea 6, 1948, 243—246; the 3rd in Bull. Bot. Gard. Btzg III, 18, 1950, 457—461; the 4th in Reinwardtia 1, 1952, 467—481; the 5th in Acta Bot. Neerl. 2, 1953, 298—307; the 6th in Blumea 7, 1954, 595—598; the 7th in Blumea 8, 1955, 170—174; the 8th in Blumea 8, 1957, 514—517; the 9th in Nova Guinea n.s. 10, 1959, 207—212; the 10th in Blumea 10, 1960, 136—141.



and myself that the material represents sterile shoots of a *Melanochyla*, and not of *Semecarpus*. We have no intention to make a new combination as we have grave doubt whether this sterile material, which is obviously from a youngish tree, can ever be identified with certainty; anyhow the judgement should be left to a future monographer. Engler has had it in hands but could, according to his label, not place it.

#### 75. The identity of *Aporosa* ? *minahassae* Koord.

In a note in *Reinwardtia* (vol. 2, 1952, 49) the late Dr. Van Slooten stated that "he would not be surprised if it would appear that *Aporosa* ? *minahassae* Koord. from N. Celebes would be a dipterocarpaceous plant, probably *Shorea koordersii*".

The plant was described by Koorders in his report on North Celebes (Med. 's-Lands Pl. T. 19, 1898, 580, 625). The isotype at the Rijksherbarium, Leyden, of the number concerned (Koorders 18743) is a tolerable specimen. It shows that the species is described from a sterile sapling. The axils of the leaves bear globular fascicles which might superficially be accepted as dense glomerules of buds, but they are really galls, similar to those frequently found in *Shorea javanica*. The large transverse leaf scars are those normally found in *Shorea* etc. Mr F. H. Hildebrand examined the wood structure of the twig and it appears that the wood is dipterocarpaceous and representative of *Shorea* sp. We may therefore safely conclude that it is a *Shorea*; it is less safe to conclude to the specific identity and it may appear undeterminable.

#### 76. *Rotala wallichii* (Hook. f.) Koehne new to Thailand (Lythraceae)

*Rotala wallichii* (Hook. f.) Koehne.

THAILAND. C. 100 km N of Bangkok, drying up clay ditch along the road, massed, with pale lilac or pinkish spikes, Nov. 24, 1957, Van Steenis 19580 (K, L, A, C, BKF).

This species which is known from India and Burma has not been cited in the Fl. Siam. En.. Messrs Kern and H. Caspers found the material exactly matching Koehne's description, except for two minor points, viz that Koehne mentioned the flowers to be white and that the leaves subtending the flowers are in the new material narrower than indicated by Koehne.

#### 77. A second collection of *Moultonia singularis* Balf. f. & W. W. Sm.

(Gesneraceae)

In 1915 this remarkable genus was described from Sarawak. It is a close ally of *Monophyllaea* but differs manifestly in having its flowers serially bursting forth from almost the entire length of the hypocotyl (petiole). It has now appeared to occur also in other parts of Borneo. A most curious incidence is that whereas *Monophyllaea* species mostly invariably occur on limestone, *Moultonia* seems to be bound to siliceous soil.

*Moultonia singularis* Balf. f. & W. W. Smith, Not. R. Bot. Gard. Edinb. 40 (1915) 349; Sarawak Mus. J. n. 6 (1915) 277—286, pl. 2; Merr. En. Born. Pl. (1921) 533.

EAST BORNEO. Sangkulirang Distr., Karangan R., on sandstone, *Kostermans* 13556 (BO, L, K, A, distributed as *Monophyllaea*), corolla green, lip white with a yellow spot, flashed by tiny purple stripes.

There are in Borneo, however, other species hitherto referred to *Monophyllaea*, which have the inflorescences emerging along the midrib (Kostermans 7562, 6908; Endert 2884; Clemens 26197) without having them on the hypocotyle. And as long ago as 1898 two native collectors of Nieuwenhuis (Amdjah 328, Jaheri 1199) have collected in Central Borneo what would appear to be a second species of *Moultonia* with inflorescences along the midrib and on the midrib and indications of such appearing on the hypocotyle, flowering setting in highest first and obviously descending. Both have a hairy calyx and are not *Moultonia singularis*. In both collections there are sessile clusters but also stalked umbel-like cincinniae. The main difference between *Moultonia* and *Monophyllaea* seems in this way to be obscured. A definite opinion on the status of these two genera should be postponed till a revision will have been made.

#### 78. A new combination in *Lespedeza* (Leguminosae)<sup>1)</sup>

*Lespedeza junghuhniana* Bakh. f. nom. nov. — *Phlebosporium cytisoides* Jungh. Naturw. Top. Reisen (1845) 346, nomen nudum; Flora (1847) 508, ditto. — *Lespedeza cytisoides* Bth. in Miq. Pl. Jungh. (1852) 230, 228 in nota. — *Campylotropis cytisoides* Bth. ex Miq. Fl. Ind. Bat. 1, 1 (1855) 229. — Non *Lespedeza cytisoides* Bertol. Mem. Acad. Sc. Ist. Bologna 2 (1850) t. 16; repr. Misc. Bot. 9 (1851) 14, t. 16.

#### 79. The identity of *Foetidia ophirensis* R. Knuth and the distribution of *Foetidia* (Lecythidaceae)

During preliminary identifications of some plants from Siam I came across a fruiting specimen which exactly fitted the description of *Foetidia ophirensis* R. Knuth (Pfl. Reich Heft 105, 1939, 63). However, the lower surface of the leaves is in this species dotted with dark glands which is a character not occurring in the other species of the genus *Foetidia*. It seemed strange that a Mascarene genus would be represented in Malaya. Furthermore, it seemed almost impossible that a small tree with showy flowers and fruits could be described in 1939 from Mt Ophir, near Malacca, which has been so thoroughly investigated, and be based on specimens a century old (Griffith 1453 and Miller 1452).

Further investigation showed that the plant in question is not a *Lecythidaceae*, but that it belongs to *Anneslea fragrans* Wall., of the *Theaceae*. And as a matter of fact I found under the latter name at Leyden Griffith and Miller material which, although unnumbered, must be regarded as isotypes. In an old German handwriting the generic name *Foetidia* occurred on the labels. Knuth took it obviously for granted that this pre-identification was correct.

The correct disposition of Knuth's species is that of a synonym under *Anneslea fragrans* Wall. var. *crassipes* (Hook. f. ex Choisy) Pierre, according to the monograph by Kobuski (J. Arn. Arb. 33, 1952, 85).

As to the further occurrence of *Foetidia* in continental Asia Knuth based *F. mauritiana* Lamk var. *elongata* Knuth (l. c. p. 63) from "East Bengal" on a sheet referred to as "Griffith n. 2420/21". Mr H. K. Airy Shaw kindly verified the Kew Herbarium and wrote that there are "4 sheets under the name *Foetidia*,

<sup>1)</sup> By Dr. R. C. Bakhuizen van den Brink Jr, Rijksherbarium, Leyden.

labelled 'Hort. Calc.', originating either from Griffith (ex herb. Lemann, 1845), or from Wallich (n. 3644), and I have no doubt that this is the origin of Knuth's 'East Bengal' specimen, as you suggest. The 'Griffith 2420/21' is no doubt a 'Kew distribution' number". These sheets have obviously not been derived from Indian material but from specimens cultivated in the Botanic Garden at Calcutta. Wallich noted in his Numerical List sub Cat. 3644 "*Foetidia mauritiana* Lam. H. B. C. Mauritio intr."

From this follows that the geographical distribution of the genus *Foetidia* is restricted to the Mascarenes and Madagascar (Réunion, Mauritius, Madagascar).

## 80. The proper generic disposition of *Phellodendron burkillii* Steen. (Rutaceae) \*)

Soon after the publication of the description of this new Malayan species Dr Hui-lin Li kindly informed me of his doubt about its proper generic disposition. He pointed out that according to the figure accompanying the description (Gard. Bull. Sing. 17, 1960, 357—360, 1 fig.), it could not belong to *Phellodendron*, as in that genus the lateral buds are concealed in a remarkable small pocket in the base of the petiole. He suggested that the species should belong to the genus *Evodia*. I am afraid I have to admit that Dr Li is right, but the fact that I erred has led to an investigation of its causes in which I was assisted by Mr M. Jacobs, who commented as follows.

*Evodia* (or *Euodia*, as the original spelling is said to be) is a large, mainly Malaysian genus, badly in need of revision. With *Phellodendron* it has in common: opposite, compound leaves; flowers sometimes in wide thyrses, unisexual, 4—5-merous; sepals small; petals mostly valvate; stamens episepalous, exserted, with suborbicular sagittate anthers, staminodial in the ♀ flowers. The ovary in the ♂ and ♀ flowers will be discussed below. A disk is said to be present in *Evodia*, but we saw hardly any.

On account of the structure of the ovary, and of the fruit, the two genera are placed into different subfamilies, the fruit being dry and dehiscent in *Evodia*, drupaceous and indehiscent in *Phellodendron*.

As mentioned above there is a good vegetative difference in the axillary buds; these are exposed in *Evodia*, but sunken in a small pocket of the petiolar base in *Phellodendron*.

Most species of *Evodia* can hardly be confused with *Phellodendron*, because of their 1—3-foliolate leaves, that is to say those belonging to sect. *Lepta* (Lour.) Engl., whereas *Phellodendron* has odd-pinnate leaves.

There are 2 sections of *Evodia*, however, where the leaves are odd-pinnate, and here confusion can arise with *Phellodendron*. They are sect. *Tetradium* (Lour.) Engl. with  $\pm$  12 species, and sect. *Oxyactis* (Benn.) Rehd. with  $\pm$  6 species. Engler is not very clear in his circumscription of these sections, and it is supposed that a new and thorough study is necessary. Of the last section no material was available in the Rijksherbarium.

In a attempt to find more characters to distinguish the 1—3-foliolate *Evodias*

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\* In collaboration with Mr M. Jacobs.



from the pinnate ones, a character can possibly be found in the development of the ovary in the ♂ flower. As it could be tested only in a few species, its value remains questionable for the time being. In all examined species of *Evodia*, the ovary in the ♀ flower has a style about as long as the ovary proper, with a flat shallowly lobed (peltate) stigma of about the same diameter as the ovary. In the ♂ flower, the ovary can either resemble merely a reduced ovary of the ♀ flower, or it can have quite a different shape, ending into 4—5 erect horn-like appendages. It occurred to us that in sect. *Lepta* (with 1—3-foliate leaves) the first type of ovary is found and in sect. *Tetradium* (with pinnate leaves) the second. The second type would also occur in sect. *Oxyactis*, to judge from Engler's description. It is remarkable, that the pinnate-leaved genus *Phellodendron* has exactly the same sort of ovaries in the ♂ flower as the pinnate-leaved *Evodias*!

Much value has been attributed to the presence of pellucid dots in the leaves of *Evodia*. This holds almost throughout the *Rutaceae* as a family character. Generally *Evodia* leaves are full of them. But in certain species, both of sect. *Lepta* and sect. *Tetradium*, there seem to be only a few marginal ones, at any rate in certain individuals, or the dots are even totally absent, as was found in *E. gjellerupii*. In *E. fraxinifolia* specimens were examined with densely dotted leaves, whereas in other specimens there are only a few marginal pellucid dots. Certainly not enough is known about the occurrence of pellucid dots in *Evodia* to base any conclusion on their frequency.

As a tentative conclusion it appears that within *Evodia* the pinnate-leaved sections seem to show such clear floral differences with the 1—3-foliolate species, that a higher rank might be more suitable to evaluate their taxonomic rank.

Furthermore, it remains most remarkable that such a very close, and as has now appeared even misleading, resemblance, vegetative, floral, and plant-geographical, is found between ♂ specimens of these pinnate-leaved *Evodias* and *Phellodendron*, which are in the Rutaceous classification placed wide apart in remote tribes. This seems to represent an unnatural condition. It is caused by the fact that in the hitherto accepted classification the greatest weight is laid on structure of floral parts and whether the fruit is dehiscent or not, a berry, drupe, or capsule, but that hardly any attention is given to vegetative characters (habit, phyllotaxis, etc.). Both *Evodia* and *Phellodendron* find themselves in their subtribes in company with such a vegetatively varied assemblage. We cannot refrain from the thought that they are more closely related than is expressed by their present classification.

Leaving these suggestions to the attention of future workers in *Rutaceae*, we return to the proper disposition of *Phellodendron burkillii*. It has appeared that it should be reduced to *Evodia meliaefolia* (Hance) Bth. Fl. Hongk. (1861) 58. This is native in Japan, China, Assam, and Indo-China, and represents a northern species in Malaysia, where it had been hitherto reported from the Philippines and northern Celebes. It is a new record for the Malay Peninsula.

As for *Phellodendron macrophyllum* Dode, the species *P. burkillii* was assumed most related to, the sketch made of its type shows exposed axillary buds, which would point to a pinnate-leaved *Evodia*. The specimen had male flowers showing the 5-appendaged rudimentary ovary (see Gard. Bull. Sing. l. c. 357, fig. e—g). In the envelope with this ♂ type specimen there were, however, drupes of *Phellodendron* which must have come from another specimen. Whether mixing up has taken place here must be ascertained later.

### 81. The identity of *Glochidion cinerascens* Miq.

In 1873 Kurz shortly discussed this Sumatran species which he was inclined to refer either to *Ilex* or to compare with *Rhamnus* or *Scutia*, but certainly not to *Euphorbiaceae* (J. Bot. 11, 1873, 207).

Recently Hoogland concluded that it would represent the Malaysian-Melanesian genus *Alphitonia* in Sumatra (Kew Bull. 14, 1960, 33).

As up till Hoogland's paper I held the record of the westernmost locality of *Alphitonia* in the Natuna Islands (NW of Sarawak) (Bull. Jard. Bot. Btzg III, 12, 1932, 167, 191), and furthermore considered that it would be surprising if *Alphitonia*, which is characteristic of and common in secondary forest, would have only once long ago been found in Sumatra, I was particularly interested in this record and have borrowed Miquel's type for further examination.

Though certainly Rhamnaceous it appears to belong to the genus *Rhamnus* and is conspecific with the Sumatran endemic species *Rhamnus lancifolius* Steen. (J. Bot. 72, 1934, 7). The specimen is in fruit and Hoogland was obviously misled by the rather strong resemblance of the leaf, acute, with sunken nervation, and underneath with a grey indument, which is deceptive.

Among the incertae sedis of *Rhamnus* and *Rhamnaceae* in the Rijksherbarium I found moreover several sheets which were distributed as *Rhamnus* and which belong to *Colubrina*.

In the sterile state it must be rather difficult to separate them but if flowers (or buds) or fruit are available it does not give much difficulty in the herbarium and they can be discriminated as follows:

*Rhamnus*: Ovary in anthesis superior, perigynous, the cupular or obconical receptacle lined about halfway up by a flat disk, the margin bearing the sepals, petals, and stamens. Flowers ♂ and ♀ (or ♀?). Drupe with a thin exocarp and hard endocarp, tardily splitting into 3—5 cocci. Calyx in fruit circumsiss losing its lobes and remaining under the fruit as a small, flattish, orbicular disk. Veins mostly transverse. Seeds without aril.

*Alphitonia* and *Colubrina* have both an inferior ovary which means that the receptacle is adnate to the ovary and is not produced as a tube with the discal lining; if the disk is present it is mostly annular. Flowers are bisexual. The growing fruit protrudes from the receptacle-tissue, coming into a semi-superior position. After falling the calyx lobes leave an annular scar on the drupe, marking the upper end of the receptacular tissue; this scar is clearly visible in ripe fruits in the lower half of the fruit.

The two genera can then further easily be differentiated as follows:

*Colubrina*: Fruit structure as in *Rhamnus*, drupe with a thin leathery exocarp without red, powdery cell-complexes and not crumbling after maturity, and hard endocarp, tardily falling apart into three or more cocci or remaining closed. Aril absent or small. Veins largely reticulate.

*Alphitonia*: Drupe with a brittle, rather thick, mostly blackish exocarp, gradually crumbling away and full of red, powdery cell-complexes; endocarp hard, splitting from the top into valves, each valve often bifid, exposing the seeds. Seeds almost entirely enveloped by a thin aril. Veins largely transverse.

*Zizyphus* can of course easily be distinguished from the three genera just mentioned by the non-dehiscent drupes with woody endocarp, triple-nerved

leaves,<sup>1)</sup> and (mostly) thorny stipules, whilst the calyx scar is found at the base of the drupe. The ovary is adnate to the flattish receptacle. Suessenguth mentioned that *Zizyphus* would also have sessile fruit, but that does not hold true (Pfl. Fam. ed. 2, 20d, 1953, 51, in clavis).

As to the nomenclatural position of *Glochidion cinerascens* Miq. its epithet cannot be used in *Rhamnus* because of *Rhamnus cinerascens* Bl. 1826 (now *Berchemia cinerascens*). As I am not aware that any previous transfer of it under a new name has been made to *Rhamnus*, its synonymy will have to run as follows:

*Rhamnus lancifolius* Steen. J. Bot. 72 (1934) 7. — *Glochidion cinerascens* Miq. Fl. Ind. Bat. Suppl. (1861) 451. — *Phyllanthus cinerascens* M. A. in DC. Prod. 15, 2 (1866) 314, non Hook. & Arn. 1837; cf. Kurz, J. Bot. — *Alphitonia cinerascens* Hoogl. Kew Bull. 14 (1960) 33.

SUMATRA. Tapanuli and Westcoast Res.: *Rahmat si Boeea* 10200; *Teysmann* HB 492 (type of *Glochidion cinerascens* Miq. in U); *Meijer* 5393 (topotype); *bb.* 6204, *bb.* 6419 (type of *Rhamnus lancifolius* Steen. in L); *Maradjo* 211.

BORNEO. Eastern Division: *Kostermans* 12940, 12958.

Of this montane tree a deviating specimen (*bb.* 17028) has been collected in Bencoolen Res. (S. Sumatra) by F. W. Rappard in which the undersurface of the leaves lacks the thin grey tomentose indument, but possesses a short-woolly indument only on the midrib and nerves. Its proper disposition should be left to a future revisor.

Both this species and *Rhamnus borneensis* are interesting in that the indument contains stellate hairs which has not been recognized by Suessenguth, l. c. p. 49, in his subdivision of the tribe *Rhamnaceae*.

## 82. Notes on some Colubrina species (Rhamnaceae)

Backer distinguished three species in Java, the common *C. asiatica* (L.) Brongn., a glabrous very widely distributed plant from the sandy beach, and two hairy species, viz *C. javanica* Miq. and *C. longipes* Backer, both endemic. The first of the latter pair has grey, rather long hairs and a cuneate leaf base, the latter a brownish woolly indument and a rounded leaf base; there are additional differences in the details of the flowers.

Both occur in arid lowland of East Java of the teak forest type and both are rare.

The type of *C. javanica* Miq. (Fl. Ind. Bat. 1, 1, 1855, 648) is a specimen collected by Horsfield. A later collection is Backer 30778, found on the N. slope of Mt Idjen, near Bajeman, 400 m alt., duplicates of which have been distributed to various herbaria.

The type of *C. longipes* Backer is Backer 3869 (L.), originally distributed under the name *C. javanica*; it was collected on the N. slope of Mt Tengger, near Bantur, 250 m alt.; an additional collection is Beumée 987 from teak forest on marl, in Rembang Res.

It has appeared that material conspecific with *C. longipes* has been described by Kurz as *C. pubescens* Kurz, from Lower Burma (Pegu). I have

<sup>1)</sup> There is, however, also a remarkable species of *Colubrina* with triple-nerved leaves in W. Malaysia, viz *C. anomala* King.



seen Tenasserim material (Galatly 558) but not the type, but Kurz mentions that the leaf is similar in shape to that of *C. asiatica*, which means that it has a cordate base, and he mentions further that it is densely fulvous-pubescent (as in *C. longipes*).

Kurz's name cannot be maintained because of homonymy; another plant under that name was described by Don, 1832, so that Backer's name seems to be the correct one.

Besides using the combination *C. longipes* for *C. pubescens* Kurz, botanists in SE. Asia should be aware that it seems very probable that also *C. javanica* Miq. occurs in SE. Asia. I derive this suspicion from the treatment of *Colubrina* in the Fl. Gén. Indo-Chine vol. 1 (1912) 930, where Pitard has incorrectly reduced *C. javanica* to *C. asiatica*, but where he described in *C. pubescens* var. *subpubescens* Pitard, l. c. p. 931, that the leaves may be cuneate or rounded at the base. It may be that *C. pubescens* is in this Flora a mixture of *C. javanica* and *C. longipes*.

The synonymy of what has been called *C. pubescens* sens. strict. is as follows:

**Colubrina longipes** Backer, Blumea 5 (1945) 520; Bekn. Fl. Java (em. ed.) 6 (1948) fam. 142, p. 11. descr. holl. — *C. pubescens* Kurz, J. As. Soc. Beng. 41, ii (1872) 301, non Don, 1832; Lawson, Fl. Br. Ind. 1 (1875) 642; Pitard, Fl. Gén. I.-C. 1 (1912) 930, pro parte?

# FLORAE MALESIANAE PRECURSORES XXX THE GENUS *SCLERIA* IN MALAYSIA

by

J. H. KERN

Rijksherbarium, Leiden

(Issued 1. XII. 1961)

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## GENERAL PART

### I. Introduction

After Boeckeler's treatise on the species of *Scleria* known in his day (5), no comprehensive study on the genus has ever been published. The preparation of an up-to-date monograph would be an arduous task, not only owing to the large size of the genus, but also to the numerous problems encountered in its delimitation and its subdivision. Fortunately several very valuable studies on the *Scleriae* of America and Africa have been published lately, which are important precursors to a future monographic treatment. Core (14) revised the American species, Chermeson (8, 9) those of Madagascar, Piérart (24) published a study on the species of Belgian Congo and Ruanda-Urundi, and Nelves (22, 23) gave an account of the genus for the whole of Africa.

The history of *Scleria* has been given by Core and need therefore not be repeated here. I may, however, venture some general remarks on the morphology of the inflorescence, as my views differ in several respects from the current ones. In this connection also the circumscription and subdivision of the genus will be discussed.

## II. The inflorescence in *Scleria*

According to Bentham (2, p. 1070) and practically all subsequent authors, in *Scleria* the female flowers are laterally inserted, below the male ones, and the glumes spirally arranged.

It is difficult to decide whether the female flower is really placed laterally. Following Kunth (19, p. 38) morphologists have generally accepted that this

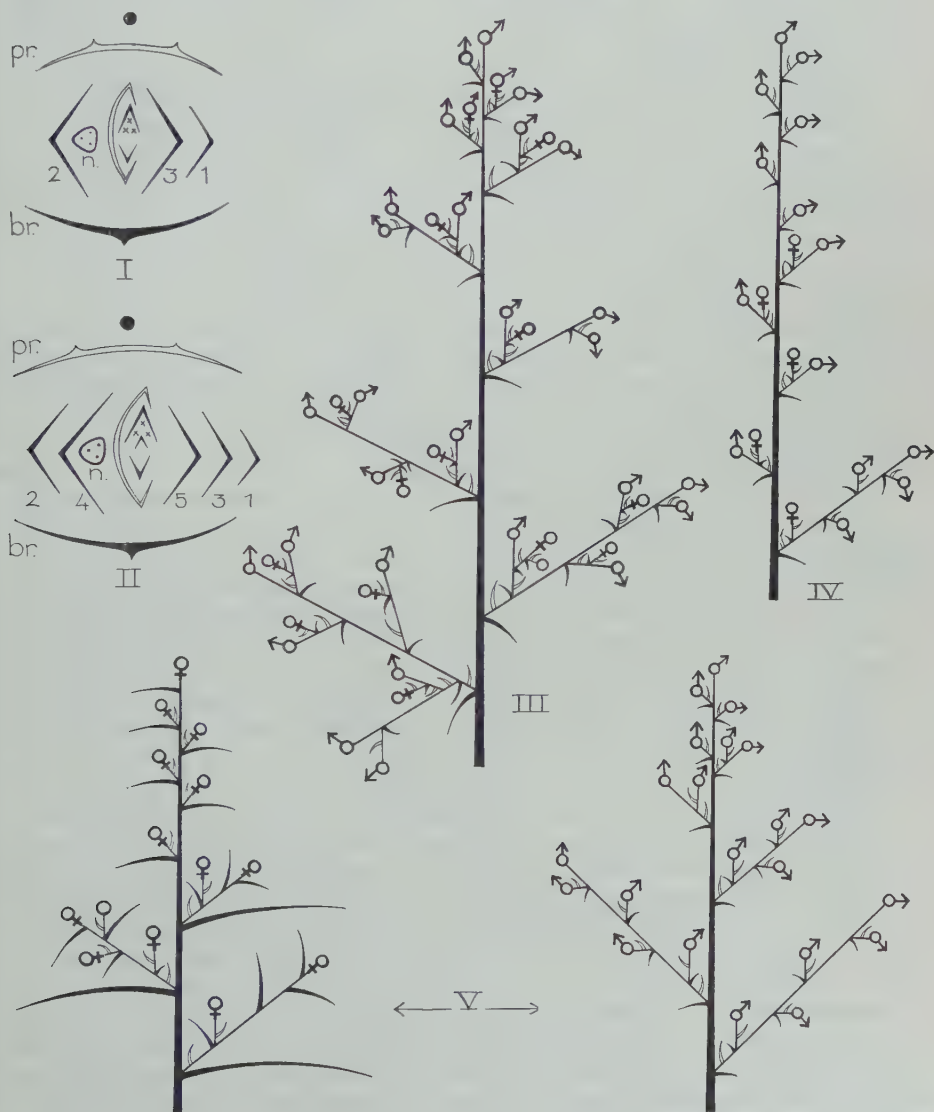


Fig. 1. Diagrams of: I-II. bisexual *Scleria* spikelets; inflorescences of: III. *Scleria sumatrensis* Retz.; IV. *S. poaeformis* Retz.; V. *S. bracteata* Cav.



flower is subtended by the glume marked "2" in diagram I, the axis of the spikelet then being situated between the nut "n" and the third glume "3". As the trigonous nuts in *Cyperaceae* are flattened against the rhachilla, having an edge next to the subtending glume, this view would cover the facts. Nevertheless I am of opinion that a more satisfactory explanation of the spikelet structure can be given. Clarke (10, p. 685) described this structure somewhat inconsistently as follows: "Bisexual spikelet with one female flower below, and a few males above, female spikelet similar, but upper male portion reduced to a small rudiment pressed laterally against the nut or occasionally O (when the female flower appears terminal)."

I assume the female flower is actually terminal. From Clarke's diagrams (13, t. 121 f. 3; t. 125 f. 5) it will be clear that in the bisexual spikelets the median plane of the female part and that of the male one are at right angles to each other. It is the male flowers which are placed laterally with respect to the single female one, as they are apparently borne on a new, lateral axis arising in the axil of the upper glume. Sometimes the prophyll of this subordinate axis is still present, backing the mother axis which is terminated by the female flower, and wrapping the tiny glumes which subtend the male flowers. In other words, the lower 1—2 (sometimes more, see diagram II) glumes are empty, the next one is the bract of a branch bearing the male flowers, which may be more or less reduced or sometimes completely suppressed. This view on the spikelet structure was already put forward by Mattfeld (20): "Bei den *Sclerieae* stehen die weiblichen Blüten terminal. Die sogenannten 'androgynen' Aehrchen von *Scleria* sind (vielfach in Schraubel übergehende) Fächel aus weiblicher Priman- und männlichen Folgeblüten."

The transverse position of the male flowers in the bisexual spikelet may easily have given rise to the conclusion that the glumes in *Scleria* are spirally arranged. However, both in the female and bisexual spikelets they are exactly distichous, as is clearly shown on Clarke's illustrations (13, t. 124 f. 3; t. 126 f. 2, etc.). One may also be misled by the fact that the short ultimate branchlets of the inflorescence are placed in the axil of a more or less glume-like bract, and their spikelets are preceded by a prophyll, both bract and prophyll inserted quite near the base of the spikelet at right angles to the median plane of the latter (transverse distichy). The bract often has a short lamina, the prophyll is recognizable by its being two-keeled. They may have been mistaken for ordinary glumes.

The lower glumes of the male spikelets are also perfectly distichous. With the thinly membranous, tightly packed upper glumes the arrangement seems to be different, possibly also due to branching within the spikelet, but this will hardly be ascertainable.

As a rule the spikelets are grouped in pairs or threes; of each pair the terminal spikelet is male, the lateral one bisexual or female and preceded by a two-keeled prophyll; if there is a second male spikelet this is also preceded by a prophyll proving its lateral position (see diagram III).

There are, however, many exceptions to this rule. For instance, in the widely distributed *Scleria poaeformis* Retz. (see diagram IV) the ultimate branches of the inflorescence are not so much reduced, but elongated with only some of the lower spikelets fascicled, the several to numerous upper male spikelets solitary; in *S. bracteata* Cav. (diagr. Va, b) from America the male spikelets



Fig. 2. Diagrams of inflorescences of: VI. *Scleria motleyi* Clarke; VII-IX. *S. caricina* (R. Br.) Benth.; X. *S. rugosa* R. Br.; XI. *S. pergracilis* (Nees) Kunth.

are restricted to the upper part of the inflorescence, the female ones to the lower part; in the Malaysian *S. motleyi* Clarke (diagr. VI) no differentiation into male and female (or bisexual) spikelets has taken place, all spikelets being alike, bisexual; *S. sphacelata* F. v. M. from tropical Australia, otherwise also considerably differing in characters from all other *Scleriae*, is dioecious. Other types of inflorescence structure occur, but the foregoing may suffice to prove

that in *Scleria* neither the male spikelets are always terminal nor the female or bisexual ones always lateral.

However, before entering further into the morphology and circumscription of *Scleria*, the status of *Diplacrum* has to be discussed.

### III. History of *Diplacrum*

The genus *Diplacrum* dates from 1810, when Robert Brown (7) based it on a Banks collection from tropical Australia. Both the generic name and the epithet *caricinum* for its sole species refer to the two glumes ("perianthium bivalve" of Brown) which tightly clasp the nut and thus simulate a sort of bicuspidate perigynium not unlike the utricle found in *Carex*. Brown suggested the close relationship between the new genus and *Scleria*, especially pointing to the great resemblance in facies of *Diplacrum caricinum* to his *Scleria pygmaea*, also a plant from tropical Australia.

Brongniart (6) figured a plant from Amboina as *Diplacrum tridentatum*, which already in the accompanying text was reduced to *D. caricinum*, and Nees (21) described a *Diplacrum* from Ceylon, *D. zeylanicum*, which Kunth (18, p. 360) also rightly referred to the synonymy of Brown's species.

Boeckeler, certainly the best cyperologist of the second half of the last century, held a different view as to the circumscription of the genus. According to him it comprised also *Scleria pygmaea* R. Br., which Brown had expressly excluded, and *Scleria capitata* Willd., nowadays generally treated as belonging in *Pteroscleria*. Boeckeler saw authentic material of *Scleria pygmaea*, and therefore it is surprising that he referred an essentially differing African plant (Barter 1041) to that species. Later on Bentham (2, p. 1071) based his *Scleria africana* on this African collection.

Besides *Scleria* and *Diplacrum* Boeckeler (4) distinguished a third genus, *Sphaeropus*, according to him intermediate between the two, though nearer to *Diplacrum*. *Sphaeropus* was based on an Australian collection (Schultz 260), which undoubtedly belongs to *Scleria pygmaea* R. Br. Like Kunth (18, p. 351), Boeckeler obviously overlooked the small male spikelets, which are to be found in every specimen of *Scleria pygmaea* — also in those of Schultz's collection! — and he concluded that he was dealing with a female specimen of a dioecious species.

Earlier, Kunth (17) had shown that the utricle in *Carex* is homologous with the prophyll which as a rule is borne at the base of the branches in *Cyperaceae*, and he had rightly denied (19, p. 40) that the glumes enveloping the nut in *Diplacrum* would be of the same nature. In Bentham's opinion there was consequently no longer any reason to uphold *Diplacrum* as a separate genus, and he merged it with *Scleria* (1).

Serious objections against the congenity of *Diplacrum* and *Scleria* were again raised by Goebel (15) in an important paper on the structure of the spikelets in some Javanese *Cyperaceae*. Goebel came to the conclusion that the distribution of the sexes in the inflorescences and the structure of the nut-bearing spikelets in *Diplacrum* are essentially different from those in *Scleria*, and that for this reason *Diplacrum* had to be placed in *Cryptangieae* of Bentham's own system, not in *Sclerieae*.

In the Flora of British India Clarke (10, p. 688) followed Bentham, but



later on, in the Flora of Tropical Africa (11), he again treated *Diplacrum* as a separate genus, though adding that there is no real line of demarcation against *Scleria*. Here as well as in the posthumously published survey of his system of *Cyperaceae* (12) Clarke merged *Pteroscleria* with *Diplacrum*.

Holtum (16) described a new *Diplacrum* from the Malay Peninsula, and S. T. Blake (3) restricted *Diplacrum* to a group of five small slender annual species of the Old World Tropics, viz *Diplacrum caricinum* R. Br., *D. reticulatum* Holtt., *D. africanum* (Benth.) Clarke, *D. pygmaeum* (R. Br.) Nees ex Boeck., and an unnamed species. There can be no doubt about their close relationship.

#### IV. *Scleria* and *Diplacrum* compared

Insufficient attention was paid to the remarkable fact that Robert Brown deliberately excluded his *Scleria pygmaea* from *Diplacrum*, "*genus proximum Scleriae, et facie omnino S. pygmaeae*." Boeckeler's transfer of the said species to *Diplacrum* was accepted without any comment by those authors who kept this genus apart, and also Bentham (2, p. 1071), who did not recognize *Diplacrum* as a separate genus, considered *Scleria pygmaea* a species "*S. caricinae arcte affinis*."

In what respect then did Brown's concept of *Diplacrum* differ from that of subsequent authors? I think a most essential difference between *Diplacrum caricinum* and *Scleria pygmaea* observed by Brown, and, to him the crucial character for generic separation, was afterwards overlooked or neglected: in *Diplacrum caricinum* the glumes fall off with the ripe nut which they enclose, in *Scleria pygmaea* they are persistent on the peduncle after the falling out of the nut. Hence Brown's terminology in *Diplacrum* "*perianthium bivalve*" versus that in *Scleria pygmaea* "*squamis femineis aristato-acuminatis*". In *Diplacrum reticulatum* Holtt. the glumes behave like in *D. caricinum*, and Brown would certainly have taken them for the perianth; in the other species included by Blake they behave like in *Scleria pygmaea*.

Although Brown's main character of *Diplacrum* does not hold for the genus as circumscribed by Blake, one may ask whether generic segregation is unjustified for this reason alone. For, Brown may have failed in the interpretation of the glumes enveloping the nut, his diagnosis of the inflorescence in *Diplacrum*, though incomplete, is quite in accordance with the results of Goebel's investigations: "*Fasciculi androgyni. Masc. lateralis, squamis scariosis. Fem. intermedius*."

Goebel described the inflorescence as follows: female spikelet terminal, with a single, terminal flower surrounded by two glumes, not rarely a vestigial bud in the axil of the upper glume; male spikelets lateral, in the axils of bracts below the female spikelet; in more compound inflorescences, however, these bracts subtend partial inflorescences, so that the whole cluster in the axil of a primary bract may contain five or even more female spikelets (see diagrams VII—IX).

According to Goebel the structure in *Scleria* is essentially different: here the female spikelets are basal off-shoots of the male ones, with the female flower placed laterally, below some glumes which may be empty or occasionally bear a male flower.

The situation is, however, much more complicated. Goebel examined only

two species, *Diplacrum caricinum* and an unidentified Javan *Scleria*, so that his far-reaching conclusions may be called somewhat premature. I have already pointed out that the female flower in *Scleria* is terminal, just like in *Diplacrum*. In the nut-bearing spikelets of several *Scleria* species the empty glumes mentioned by Goebel are completely suppressed, reduced to a vestigial axillary bud also occurring in *Diplacrum*. As to the disposition of the female and male spikelets, it should be remembered that here the terms "terminal" and "lateral" can not be used in an absolute sense. In diagram VII the male spikelets are indeed lateral with respect to the single female one, but so are several of the female spikelets in diagrams VIII—IX with respect to the male ones. It is self-evident that the disposition of spikelets called characteristic of *Scleria* is not found in many of its species, such as *S. poaeformis*, *S. bracteata*, *S. motleyi*, *S. pergracilis* (diagr. XI), *S. sphacelata*, and others. In *Scleria rugosa* R. Br. (= *S. flaccida* Clarke), which certainly does not belong to *Diplacrum*, I find the main axis terminated by a male spikelet, but the branches are of exactly the same structure as in *Diplacrum caricinum* (see diagram X). If Clarke's figures of *S. flaccida* (13, t. 127 f. 3—5) are correct, the inflorescence can in details be structured as in *Diplacrum*. According to me the inflorescence in *Diplacrum* represents but one of the numerous variations in type occurring in *Scleria*.

Some other characters have been mentioned as being found in *Diplacrum*, not in *Scleria*. Three-lobed glumes of the female spikelets are characteristic of some *Diplacrum* species, but they are not found in *D. reticulatum* Holtt. nor in *Scleria pygmaeopsis*, which close ally of *Scleria pygmaea* will be described below. In all *Diplacra* there are only two glumes enveloping the nut, but their number in *Scleria* is far from being constant, ranging from three to six. The number of stamens, probably always one in *Diplacrum*, varies in *Scleria* between one and three. Blake (3) is of opinion that the nut in *Diplacrum* differs from that in *Scleria*, the former tending to be heavily ribbed vertically, but *Diplacrum reticulatum* was named after the reticulated nut, and in *Scleria laxa* R. Br. the vertical ribs are very prominent.

Taking into account all the above-mentioned facts, I fail to see any valid point of generic discrimination between *Diplacrum* and *Scleria*. As regards Goebel's assertion that *Diplacrum* should be removed to *Cryptangieae*, I am of opinion that in Bentham's system the assignment of the various genera to *Sclerieae* or *Cryptangieae* is very unnatural, as intimately related genera, such as *Kobresia* and *Carex*, or *Pteroscleria* and *Scleria*, were placed in different tribes.

## V. On *Sphaeropus* Boeck.

*Scleria pygmaea*, as compared with *Diplacrum caricinum*, is not only remarkable on account of the behaviour of its glumes and nut, but also on account of another character which seems to be just as much neglected, though it was already mentioned by Kunth (18, p. 351): "*squamis ..... duabus interioribus ovato-ellipticis ..... ex his inferiore basi subgloboso-tumida.*" The generic name *Sphaeropus*, based on the same species, obviously alludes to this character: the peculiar, strongly swollen apex of the peduncle, spongy by the much inflated cells (see 13, t. 134 f. 2). Boeckeler took this apex for a part of the perigynium: "*Perigynium duplex: superius diphyllosum .....; inferius*

(*e bracteolis confusis tribus formatum*) *pedicellatum crassiusculum globoso-trigonum, vertice leviter depressum, celluloso-reticulatum pallidum.*"

The character seems to be more or less correlated with that of the behaviour of the glumes and nuts, for it is only pronounced in those species of *Diplacrum* as understood by Blake, with glumes persistent on the peduncle, not in those in which the glumes fall with the nut. Two presumably natural groups can therefore be distinguished (see below).

## VI. Staminodes in *Scleria*?

As is frequently the case in anemophilous flowers, the filaments in *Scleria* strongly lengthen before anthesis. After the pollen has been discharged, the anthers fall from the persistent, more or less strap-shaped filaments. Throughout *Cyperaceae* such filaments can be observed. De Wildeman (27) studied them in some African *Scleriae*. He supposed them to be destitute of anthers from the beginning and for this reason an example of the regression of the androecium in plants with active vegetative propagation. Piérart (24, p. 9) affirmed the occurrence of 'staminodes' in all or at least in all Congolese *Scleriae* and mentioned also organs intermediate between stamens and staminodes.

However, as in young spikelets no sterile filaments are to be found, and in deflorate spikelets all filaments look like staminodes because of the disappearance of the anthers, there is in my opinion no reason whatever to accept the occurrence of staminodes in the flowers of *Scleria*.

## VII. The sections of *Scleria* represented in Malaysia

In Clarke's papers on *Cyperaceae* and also in those of Nelmes, the genus *Scleria* is — apart from some exclusively American or African groups — subdivided into two subgenera, *Scleria* proper and *Hypoporum*. During my work on the Malaysian members of the genus the question arose whether these subgenera are also acceptable for the grouping of the species under consideration.

Nees's excessive and far from natural splitting up of the *Scleriae* known in his day into some fifteen small genera, we may pass almost without comment, as only a few Asiatic species are involved. For nomenclatural reasons it may be remarked that even the two species on which Bergius based the genus, were excluded from *Scleria*. Nees's system, which rested almost solely on the greatly varying shape of the hypogynous disk, was not accepted by any subsequent author, but several of his generic names have later on been used for designating subgenera or sections.

Only two of the segregated genera contained Asiatic species. The monotypic genus *Cylindropus* was based on the Ceylonese *Cylindropus junciformis* Nees (*Scleria pilosa* Boeck.; *S. junciformis* Thwaites, non Kunth). It was defined as follows: "*Nux perigynio arcto cylindrico truncato basi constricta.*" Already Endlicher rightly united it with *Scleria*.

*Hypoporum* was published in the Edinburgh New Philosophical Journal of 1834. Here it contained only two species, *Hypoporum pergracile* and *H. capitatum*. As the latter species was excluded from *Hypoporum* by Clarke (10, p. 689: "not a *Hypoporum*"), the former has to be considered the type species of the genus.



Obviously Nees had a much wider circumscription of the genus in mind, for in Linnaea 9 of 1835 a large number of *Hypoporum* species were enumerated. However, neither the original diagnosis "*spiculae androgynae* .....; *foeminea infera, masculum terminalem amplexens*," nor that in the Flora Brasiliensis II, 1, 1842, p. 158 ("*spiculae androgynae, feminea masculam infraterminalem* [sic!] *includens*") fit the strictly unisexual spikelets of *Hypoporum capitatum*. The transfer of *Scleria lithosperma* to *Hypoporum*, generally cited as dating from 1834, was made only in 1842.

Kunth, to whom *Cylindropus* was only known from the description, provisionally upheld this genus in his Enumeratio, but *Hypoporum* was merged with *Scleria*. The reasons were explained in Kunth's paper on the *Sclerineae* and *Caricineae* (19, p. 39): "Herr Nees von Esenbeck scheint den Discus in einer Abtheilung dieser Gattung [= *Scleria*], wo er sich stiel förmig zeigt, gänzlich übersehen zu haben, denn seine Gattung *Hypoporum*, welche jene Arten in sich begreift, soll sich von *Scleria* durch die Abwesenheit des Perigynium's unterscheiden. Hiernach scheint kein Grund vorhanden zu sein, die Gattung *Hypoporum* beizubehalten, zumal da die übrigen Merkmale, welche von der äussern Beschaffenheit des Pericarpiums hergenommen sind, mir weder wichtig genug erscheinen, noch in allen Neesischen Arten angetroffen werden."

When Clarke in 1894 (10, p. 685 & 686) divided the Indian *Scleriae* into two subgenera, he took up the name *Hypoporum* for one of them. Because, for the circumscription of the genera in *Cyperaceae* and their subdivisions, he laid stress mainly on the distribution of the sexes in the spikelets, *Hypoporum* was defined as having many bisexual spikelets, in contradistinction to *Scleria* proper with none or few. In consequence of this definition, Clarke was obliged to include *Scleria corymbosa*, with many bisexual spikelets and a much reduced disk, in *Hypoporum*, although it will be evident that its placing in one subgenus along with *Scleria pergracilis* and the numerous African and American allies of the latter must be erroneous.

More difficulties arose when Clarke described the Malaysian *Scleria motleyi*, for in this species all the spikelets are bisexual, but the disk is well-developed. Originally it was placed under the heading "Many of the spikelets (apparently) 2-sexual", along with *Scleria lithosperma* and *S. corymbosa*, but later on (12, p. 132) in a new subgenus, *Brownia* ("*E spiculis plures androgynae. Discus obviuus*").

From the foregoing account it will be clear that neither on the ground of the development of the hypogynous disk, nor on that of the distribution of the sexes in the spikelets, the Malaysian *Scleriae* can be divided into two subgenera. If the much reduced (but not absent!) disk is taken for the crucial character of *Hypoporum*, *Scleria neesii* (= *Hypoporum capitatum*) has to be placed in this subgenus, but its close ally *S. carphiformis* in *Scleria* proper. The accommodation into one subgenus of those species with bisexual spikelets would be even more artificial. Bisexual spikelets are found in *Scleria pergracilis*, *S. lithosperma*, *S. corymbosa*, *S. motleyi* and its allies, but are moreover not rare in *S. biflora*, *S. annularis*, *S. tricuspidata*, and *S. novae-hollandiae*. In the stout, perennial species, such as *Scleria terrestris*, *S. poaeformis*, *S. scrobiculata*, and their allies, the male part of the nut-bearing spikelets is usually reduced to a sterile glume which sometimes may be absent, but a single or some male flowers besides the female one are often present in *Scleria psilorrhiza* and *S. junghuhniana*.

De Wildeman (26) criticized Clarke's subdivision of *Scleria*, but did not propose any correction. In my opinion the way out of the difficulties seems to be the distinction of groups (sections) of apparently more or less closely related species. An attempt to this subdivision is given on p. 151. I am well aware of the shortcomings of this survey. *Scleria cyathophora* may be misplaced, for it has much in common with the species of *Sect. Scleria*. The species with 'whorled' leaves might possibly be united in a separate section. *Scleria corymbosa* and *S. lithosperma* agree with each other in so many characters that I have ventured to place them in the same section, though with great hesitation. It is doubtful whether the remarkable differences between *Sphaeropus* and *Diplacrum* justify their separation on sectional level. The fact that I am not sure whether *Sect. Carphiiformes* has rightly been inserted under the perennial species, is less important.

A few remarks may be made on *Subgen. Schizolepis* (Nees) Clarke, though it only comprises American and African species. It is characterized by the fimbriate or serrate margin of the hypogynous disk. Both Core and Nelves say that in "*Euscleria*" this margin is entire, which is not true for several Malaysian species. In *Scleria levis*, *S. oblata*, *S. terrestris*, and *S. ciliaris* the disk-lobes are often minutely denticulate, and in *S. sumatrensis*, *S. scrobiculata*, *S. polycarpa*, and *S. purpurascens*, the pronounced denticulation is hardly if at all different from that in some *Schizolepis* species. As an additional character in *Schizolepis* Clarke (Fl. Cap. 7, 1898, 294) mentions "leaves broad, the margins praemorse at unequal distances from the top." However, premorse leaves are also found in some Madagascan and American species belonging to *Scleria* proper, and in one Asiatic species of *Sect. Scleria*, viz *S. psilorrhiza* (see p. 177). If *Schizolepis* is to be upheld as a subgenus or section, its diagnosis needs emendation.

Piérart (24, p. 63) presumed an evolution in *Scleria* from bisexual spikelets to unisexual ones correlated with the gradual development of the hypogynous disk. Nelves (22, p. 415) considered bisexual spikelets also primitive, but felt inclined to the opinion that the disk has tended to become reduced and vestigial. The interrelationships of the Malaysian species are so very complicated that it seems impossible to trace a rectilinear development.

### VIII. Acknowledgements

I wish to express my indebtedness to the Directors of the Herbaria who sent on loan the rich material cited in the systematic part of the present paper. Dr. S. T. Blake, Brisbane, had already revised a large part of the Malaysian specimens, when I took over their study. His identifications have been a great help to me. My thanks are also due to Mr. E. A. Robinson, who generously placed at my disposal his manuscript on the annual species of *Scleria*, *sect. Scleria* represented in Africa. This manuscript contains many valuable emendations on Nelves's papers.

## SPECIAL PART

## SCLERIA Berg.

Kongl. Vet. Acad. Handl. Stockholm 26, 1765, 142, t. 4, 5; Boeck., *Linnaea* 38, 1874, 436—542.

Type species: *Scleria flagellum-nigrorum* Berg. (cf. Core, *Brittonia* 2, 1936, 88).

*Diplacrum* R. Br., Prodr. Fl. Nov. Holl., 1810, 240.

Type species: *Diplacrum caricinum* R. Br.

*Sphaeropus* Boeck., *Flora* 56, 1873, 89.

Type species: *Sphaeropus pygmaeus* Boeck.

Monoecious, exceptionally dioecious. Perennial, often stout herbs with short or creeping, often nodose rhizome, or annuals with fibrous roots. *Stems* solitary or more or less tufted, mostly erect, sometimes scrambling over bushes, trigonous or triquetrous, leafy in the lower part or throughout, smooth or scabrid. *Leaves* 3-ranked, narrowly to broadly linear, sheathing the stem, smooth to very scabrous on the margins and the main nerves, the lower ones reduced to bladeless or almost bladeless sheaths; midnerve prominent beneath, 2 lateral nerves prominent above; blades sometimes 'premore' (the proximal part broad, 5-nerved, suddenly narrowed at unequal distances from the top into the 3-nerved distal part); sheaths closed, not rarely 3-winged, eligulate, the apex on the ventral side truncate or produced into a tongue (contraligula). *Inflorescence* paniculate, consisting of a terminal partial panicle and usually some lateral ones, sometimes reduced to dense clusters, or glomerate-spiceform with glume-like bracts. *Spikelets* all bisexual, or bisexual and male, or female and male; bisexual spikelets composed of 1 terminal female flower and 1—several lateral male ones; female spikelets with 1 female flower and not rarely 1—2 lateral empty glumes (the reduced male part); male spikelets with several to numerous flowers. *Glumes* (except for the upper ones of the male spikelets and of the male part of the bisexual spikelets) distichous, in the lateral spikelets at right angles to the pertinent bract and prophyll, the lower 2—4 empty. *Flowers* unisexual, achlamydeous, the male ones consisting of 1—3 stamens with free, rarely connate filaments, and oblong to linear anthers with more or less produced connective; female flowers with a 3-carpellate pistil; style continuous with the ovary, caducous, the base often persistent on the nut; stigmas 3, filiform. *Nut* globose, ovoid, ellipsoid, or pyramidal, terete or trigonous, smooth or variously sculptured, glabrous or hairy, with crustaceous pericarp, white, more rarely bluish, ultimately often discoloured, shining, more rarely dull, borne on a gynophore (cupula), which is dilated at the apex into a more or less trilobate, but sometimes much reduced, disk adhering to the ripe nut; outer cells of nut very small, quadrate-hexagonal.

*Distribution*: Large genus of about 200 species, mainly pantropical, but in N. America and Japan extending beyond the 40th N. parallel, and in S. America and S. Africa reaching the 35th S. parallel; see map in Piérart, *Lejeunia*, Mém. 13, 1951, 18.

In Malaysia 34 species.

*Notes*. 1. The tongue-shaped appendage into which the top of the ventral side of the leaf-sheath in many *Scleriae* and several *Carices* is drawn out, is



generally referred to as "ligula". Senay (Bull. Mus. Hist. Nat. Paris II, 22, 1950, 619) proposed the name "antiligule", and Chermezon (Rev. Gén. de Bot. 38, 1926, 343) the name "pseudoligule". For linguistic reasons I prefer to name it 'contraligula'.

2. For the following species, which are more or less common in Malaysia and represented by numerous sheets in the various herbaria, I have restricted the account of the material studied to a brief enumeration of the collectors' numbers, without indication of herbaria and precise localities: *Scleria levis*, *S. oblata*, *S. terrestris*, *S. ciliaris*, *S. sumatrensis*, *S. scrobiculata*, *S. purpurascens*, *S. lithosperma*, *S. biflora*, and *S. caricina*.

### Conspectus of the Malaysian Scleriae

This concise survey of the taxa represented in Malaysia is not intended as a key to the species

1. Perennials.
2. Glumes glabrous or minutely hairy. Spikelets not in globose clusters, at most 6 mm long.
3. Hypogynous disk well developed.
  4. Nut-bearing spikelets bisexual (not always in *S. cyathophora*). Nut usually trigonous. Glumes shortly hairy . . . . . *Sect. I. Browniae*
  5. All spikelets bisexual. Nut prominently trigonous, conical with flat sides.
    6. Nut erostrate . . . . . 1. *S. motleyi* ssp. *motleyi*
    6. Nut rostrate . . . . . 1a. *S. motleyi* ssp. *rostrata*
  5. Strictly male spikelets present. Nut less prominently trigonous.
    7. Disk not cyathiform.
      8. Disk not lobed . . . . . 2. *S. densispicata*
      8. Disk 3-lobed; lobes very broad, truncate, membranous.
        9. Leaves crowded at the base of the flowering stems, moreover 1—2 higher up . . . . . 3. *S. papuana*
        9. Leaves about equally distributed along the flowering stems . . . . . 4. *S. brownii*
    7. Disk cyathiform . . . . . 5. *S. cyathophora*
  4. Nut-bearing spikelets usually unisexual, the male part reduced to a sterile glume or sometimes to 1—2 flowers. Nut terete or obscurely trigonous. Glumes glabrous or minutely ciliolate . . . . . *Sect. II. Scleria*
  10. Leaves about equally distributed along the flowering stems.
    11. Disk-lobes acute, lanceolate or almost so.
      12. Disk-lobes muticous . . . . . 6. *S. levis*
      12. Disk-lobes mucronulate by a short stiff point . . . . . 7. *S. benthamii*
    11. Disk-lobes broadly rounded.
      13. Nut depressed-globose . . . . . 8. *S. oblata*
      13. Nut globose or ovoid.
        14. Inflorescence consisting of a terminal panicle and 1—several lateral ones, the latter subtended by foliaceous bracts. Spikelets in clusters of 2—4.
        15. Nut at most 3 mm long, usually shorter, apiculate.
          16. Contraligule with a membranous appendage which is broader than long, band-like . . . . . 9. *S. terrestris*
          16. Membranous appendage of the contraligule much longer than broad, lanceolate . . . . . 10. *S. ciliaris*
    15. Nut large, at least 3 mm long, muticous.
      17. Contraligule with cartilaginous margin, not

- appendaged. Inflorescence dense, narrow  
 11. *S. psilorrhiza*
17. Contraligule with a membranous appendage. Inflorescence ample, very open  
 12. *S. junghuhniana*
14. Inflorescence a single terminal panicle without leafy bracts. Spikelets solitary, evenly distributed along the branches . . . . . 13. *S. poaeformis*
10. Leaves (falsely) whorled.  
 18. Disk large, cyathiform . . . . . 14. *S. sumatrensis*  
 18. Disk not cyathiform.  
 19. Nut-bearing spikelets rather evenly distributed throughout the obliquely erect branches of the partial panicles.  
 15. *S. polycarpa*
19. Nut-bearing spikelets chiefly restricted to the base of the spreading branches of the partial panicles.  
 20. Nut white, scrobiculate, rarely smooth.  
 21. Nut globose or ovoid,  $2\frac{1}{2}$ —3 mm high  
 16. *S. scrobiculata* ssp. *scrobiculata*  
 21. Nut depressed-globose,  $1\frac{1}{2}$  mm high  
 16a. *S. scrobiculata* ssp. *discocarpa*  
 20. Nut soon discoloured, cancellate 17. *S. purpurascens*
3. Hypogynous disk much reduced, obsolete. Nut-bearing (or all) spikelets bisexual. Nut trigonous, with 3 basal depressions . *Sect. III. Corymbosae*  
 22. Partial panicles copious, dense, corymbiform . . . 18. *S. corymbosa*  
 22. Partial panicles very loose, with almost spiciform branches.  
 23. Nut smooth except for the rugulose depressions at the base  
 19. *S. lithosperma* var. *lithosperma*  
 23. Nut rugulose throughout . . . 19a. *S. lithosperma* var. *linearis*
2. Glumes long-hairy. Spikelets in a dense, globose, terminal cluster, 1—2 smaller lateral clusters whether or not added. Spikelets large, (6—)8—9 mm long  
*Sect. IV. Carphiformes*  
 24. Hypogynous disk well developed . . . . . 20. *S. carphiformis*  
 24. Hypogynous disk reduced to a columnar stipe . . . . . 21. *S. neesii*
1. Annuals.  
 25. Inflorescence linear, spiciform, unbranched, without leafy bracts  
*Sect. V. Hypoporum*  
 22. *S. pergracilis*
25. Inflorescence otherwise, with leafy bracts.  
 26. Nut-bearing spikelets with at least 3 glumes . . . *Sect. VI. Tessellatae*  
 27. Nut with 2 basal deep pits in each sinus of the disk-lobes, regularly cancellate, the lacunae mostly square to broader than long.  
 28. Disk-lobes lanceolate, gradually narrowed upwards  
 23. *S. biflora* ssp. *biflora*  
 28. Disk-lobes suddenly caudate-mucronate from an ovate base  
 23a. *S. biflora* ssp. *ferruginea*
27. No deep pits between the disk-lobes. Nut, when cancellate, with longitudinally elongate lacunae.  
 29. Male spikelets at least partly much shorter than their peduncles. Nut scrobiculate . . . . . 24. *S. mikawana*  
 29. Male spikelets longer than or as long as their peduncles.  
 30. Nut ovoid or ellipsoid.  
 31. Nut laterally compressed, very smooth and shining  
 25. *S. annularis*
31. Nut not compressed, not very smooth and shining.  
 32. Disk-lobes muticous, or disk not lobed.  
 33. Disk not or hardly lobed. Nut smooth or slightly cancellate, dull . . . 26. *S. novae-hollandiae*  
 33. Disk distinctly lobed. Nut deeply cancellate, shining . . . . . 27. *S. parvula*  
 32. Disk-lobes mucronulate by a short, stiff point  
 28. *S. tricuspidata*

- 30. Nut globose.
- 34. Disk not cellular-glandular.
- 35. Nut deeply longitudinally ribbed or scrobiculate . . . . . 29. *S. laxa*
- 35. Nut smooth . . . . . 30. *S. thwaitesiana*
- 34. Disk cellular-glandular . . . . . 31. *S. rugosa*
- 26. Nut-bearing spikelets with 2 glumes.
- 36. Ripe nuts falling out of the glumes which are persistent on the rachilla  
Sect. VII. *Sphaeropus*
- 32. *S. pygmaeopsis*
- 36. Ripe nuts closely enveloped by the glumes and falling with them  
Sect. VIII. *Diplacrum*
- 37. Glumes of the female spikelets 3-lobed . . . . . 33. *S. caricina*
- 37. Glumes of the female spikelets entire . . . . . 34. *S. reticulata*

### Key to the Malaysian Scleriae

In the measurements of the nuts the adhering hypogynous disk is not included

- 1.a. Glumes beset with long, patent hairs . . . . . 2
- b. Glumes glabrous, sometimes minutely appressed-hairy . . . . . 4
- 2.a. Nut-bearing spikelets 3—4 mm long. Nut smooth or more or less rugulose, often somewhat tuberculate at the top, glabrous. Spikelets in small, axillary clusters (one cluster terminal) . . . . . 31. *S. rugosa*
- b. Nut-bearing spikelets much larger, (6—)8—9 mm long. Nut densely tuberculate throughout, stellately hairy on the top of each tubercle. Spikelets in a dense, globose, terminal cluster 1—2 cm across, 1—2 smaller lateral clusters whether or not present . . . . . 3
- 3.a. Besides the terminal cluster of spikelets 1—2 smaller clusters lower down on the stem in the axil of a leaf-like bract. Disk well developed, patelliform, almost as wide as the nut . . . . . 20. *S. carphiformis*
- b. No axillary clusters. Disk reduced to a columnar, triquetrous stipe much narrower than the nut . . . . . 21. *S. neesii*
- 4.a. Inflorescence linear, spiciform, unbranched, with several almost sessile clusters of spikelets, without leafy bracts. Spikelets all bisexual,  $2\frac{1}{2}$ —3 mm long. Strongly lemon-scented annual . . . . . 22. *S. pergracilis*
- b. Inflorescence otherwise. Plant not lemon-scented . . . . . 5
- 5.a. Nut-bearing spikelets with 2 glumes,  $1\frac{1}{2}$ —3 mm long; male spikelets 1—2 mm long. Spikelets strictly unisexual, in very small, axillary, head-like, subsessile clusters. Disk obsolete . . . . . 6
- b. Nut-bearing spikelets with at least 3 glumes. Other characters not united . . . . . 8
- 6.a. Glumes of the female spikelets distinctly 3-lobed, prominently several-nerved. Ripe nut completely hidden by the connivent glumes and falling with them  
33. *S. caricina*
- b. Glumes of the female spikelets entire, with only the midnerve more or less prominent . . . . . 7
- 7.a. Ripe nut completely hidden by the connivent glumes and falling with them, depressed-globose, tuberculate-reticulate between the 3 longitudinal ribs,  $\frac{3}{4}$  mm high, 1— $1\frac{1}{4}$  mm broad. Peduncle of female spikelet not or hardly swollen at the top  
34. *S. reticulata*
- b. Ripe nut visible between the more or less spreading glumes, falling out of them, globose, longitudinally costulate with 3 more prominent ribs,  $\frac{1}{2}$ — $\frac{3}{8}$  mm long and wide. Glumes persistent on the rachilla. Peduncle of female spikelet bulbously swollen and spongy at the top . . . . . 32. *S. pygmaeopsis*
- 8.a. Middle leaves of the flowering stems clustered in groups of (2—)3(—5), thus forming pseudo-whorls. Commonly stout perennials with decompound inflorescences consisting of several partial panicles . . . . . 9
- b. Leaves not in pseudo-whorls . . . . . 13
- 9.a. Disk cyathiform, covering at least the lower half of the nut, halfway or less 3-lobed, the lobes broadened upwards, contiguous or overlapping, truncate or very obtuse,



- crenulate at the top, at first yellow, ultimately dark red. Nut small, 2 mm diam., olivaceous brown to greyish black . . . . . 14. *S. sumatrensis*
- b. Disk much smaller, not cyathiform, its lobes narrowed upwards, separated from each other, entire or denticulate at the top . . . . . 10
- 10.a. Nut strongly depressed, small,  $1\frac{1}{2}$  mm high,  $2-2\frac{1}{8}$  mm broad, not or hardly mucronate . . . . . 16a. *S. scrobiculata* ssp. *discocarpa*
- b. Nut not depressed, ovoid or globose, 2—3 mm high . . . . . 11
- 11.a. Branches of the narrow partial panicles obliquely erect. Ultimate bractlets inconspicuous, much shorter than the branchlets in their axils. Nut-bearing spikelets rather evenly distributed throughout the partial panicles, rounded at the base. Nut slightly rugulose to smooth, hardly or not mucronate, often tinged with blue. Disk at first yellow, ultimately reddish. Stems and upper side of the leaves often asperous . . . . . 15. *S. polycarpa*
- b. Branches of the broad partial panicles spreading. Ultimate bractlets conspicuous, about as long as to much longer than the branchlets in their axils. Nut-bearing spikelets chiefly restricted to the base of the branches of the partial panicles. Nut mucronate, white or discoloured, scrobiculate or cancellate, very rarely smooth . . . . . 12
- 12.a. Nut cancellate, at first whitish, soon discoloured (dingy purple to blackish),  $2-2\frac{1}{2}$  mm long. Nut-bearing spikelets cuneate at the base. Leaf-sheaths wingless. Underside of leaves often more or less pubescent with long, white hairs . . . . . 17. *S. purpurascens*
- b. Nut scrobiculate (very rarely smooth), white,  $2\frac{1}{2}-3$  mm long. Nut-bearing spikelets rounded at the base. Leaf-sheaths wingless to broadly winged. Leaves glabrous . . . . . 16. *S. scrobiculata*
- 13.a. (8). Disk-lobes mucronulate by a short (easily overlooked!), erect, stiff point . . . . . 14
- b. Disk-lobes not mucronulate, or disk obsolete . . . . . 16
- 14.a. Nut exactly globose or slightly depressed, strikingly cancellate, densely ferrugineous-pubescent on the walls between the lacunae, with dark purplish to blackish beak and 2 basal, deep pits in each sinus of the disk-lobes . . . . . 23a. *S. biflora* ssp. *ferruginea*
- b. Nut ovoid, rugulose or obscurely cancellate, beakless or with white beak, sparsely pubescent or glabrous, without basal pits . . . . . 15
- 15.a. Nut distinctly beaked, somewhat tuberculate at the top. Annual . . . . . 28. *S. tricuspidata*
- b. Nut not beaked, not tuberculate. Perennial . . . . . 7. *S. benthamii*
- 16.a. Disk distinctly cup-shaped, reaching to about half the height of the nut, shortly 3-lobed, thin, yellowish or rufidulous. Nut obtusely but distinctly trigonous, hardly umbonulate, hirtellous with ferrugineous hairs . . . . . 5. *S. cyathophora*
- b. Disk shorter, sometimes obsolete, when attaining half the height of the nut not cup-shaped . . . . . 17
- 17.a. Disk-lobes very broad (broader than long), membranous, white, truncate, erect or spreading upwards, the disk looking like a stand-up collar under the nut . . . . . 18
- b. Disk-lobes otherwise, or disk obsolete . . . . . 19
- 18.a. Leaves crowded at the base of the flowering stems, and moreover 1—2 distant higher up, 5—10 mm wide. Stems 100—150 cm by 2—3 mm, the base clothed with the fibrous remains of decayed leaf-sheaths. Inflorescence 30—60 cm long. Spikelets  $3-3\frac{1}{2}$  mm long. Beak of nut white . . . . . 3. *S. papuana*
- b. All leaves about equally distributed along the stems, 2—3 mm wide. Stems 20—60 cm by  $1-1\frac{1}{2}$  mm; no fibrous remains of decayed leaf-sheaths. Inflorescence 3—12 cm long. Spikelets 4—6 mm long. Beak of nut brown or blackish . . . . . 4. *S. brownii*
- 19.a. Nut with 3 basal depressions which are rugulose by transverse, wavy, ferrugineous ridges, trigonous. Disk reduced to a narrow, brown band concrete with the nut. Inflorescence very loose, with spiciform branches . . . . . 20
- b. Nut without or with smooth basal depressions. Other characters not united . . . . . 21
- 20.a. Nut smooth except for the rugulose depressions at the base . . . . . 19. *S. lithosperma* var. *lithosperma*
- b. Nut rugulose throughout . . . . . 19a. *S. lithosperma* var. *linearis*
- 21.a. Annuals with fibrous, red roots. Usually small plants . . . . . 22
- b. Perennials with distinct, woody, often nodose rhizomes. Usually stout plants . . . . . 31
- 22.a. Nut ferrugineous-pubescent on the walls between the lacunae of the deeply cancellate nut . . . . . 23
- b. Nut glabrous . . . . . 25
- 23.a. Nut ellipsoid, with white beak, not deeply pitted at the base, the lacunae mostly

- longitudinally elongate. Disk-lobes ovate, acute . . . . . 27. *S. parvula*
- b. Nut exactly globose or somewhat depressed-globose, with purplish to blackish beak and 2 basal, deep pits clearly visible in each sinus of the disk-lobes, the lacunae on the surface of the nut at least for the greater part square to broader than long 24
- 24.a. Leaves weak, 3—4 mm wide. Disk-lobes lanceolate, gradually narrowed upwards, very acute, reaching to half the height of the nut 23. *S. biflora* ssp. *biflora*
- b. Leaves rigid, 1—2 mm wide. Disk-lobes suddenly caudate-mucronate from an ovate base, shorter, reaching to about  $\frac{1}{3}$  height of the nut
- 23.a. *S. biflora* ssp. *ferruginea*
- 25.a. Stems retrorsely scabrid on the angles. Nut very smooth and shining, ovoid, more or less laterally compressed, not apiculate. Disk not lobed . . . . . 25. *S. annularis*
- b. Stems smooth (in *S. mikawana* rarely somewhat scabrid at the top). Nut not compressed . . . . . 26
- 26.a. Male spikelets at least partly much shorter than their peduncles, which are often reddish and recurved. Nut globose or ovoid-globose, minutely umbonulate, scrobiculate (the walls between the lacunae broad, forming a more or less continuous surface interrupted by the pits). Disk 3-lobed, with oblong lobes . . . . . 24. *S. mikawana*
- b. Male spikelets longer than or as long as their peduncles. Nut variously sculptured or smooth . . . . . 27
- 27.a. Disk-lobes ovate, acute. Nut prominently cancellate . . . . . 27. *S. parvula*
- b. Disk-lobes semi-orbicular, rounded, or disk hardly lobed . . . . . 28
- 28.a. Nut ellipsoid or oblong-ellipsoid, with nearly parallel sides, dull, white,  $2\frac{1}{4}$ — $2\frac{3}{4}$  mm long. Disk hardly lobed, triangular with rounded angles. Cupula (and its scar in the centre of the disk) deeply 3-lobed . . . . . 26. *S. novae-hollandiae*
- b. Nut globose, shining,  $1\frac{1}{3}$ — $1\frac{4}{5}$  mm across. Cupula not lobed . . . . . 29
- 29.a. Disk densely cellular-glandular. Peduncles of the partial inflorescences relatively stout
31. *S. rugosa*
- b. Disk not cellular-glandular. Peduncles of the partial inflorescences slender, filiform 30
- 30.a. Nut deeply longitudinally ribbed or scrobiculate . . . . . 29. *S. laxa*
- b. Nut smooth . . . . . 30. *S. thwaitesiana*
- 31.a. (21). Inflorescence a single, terminal, much branched, long-peduncled panicle with a short, setaceous bract at the base, or ebracteate, very rarely a lateral panicle in the axil of a leafy bract added. Spikelets not clustered, solitary along the numerous spiciform branches of the panicle . . . . . 13. *S. poaeformis*
- b. One or more lateral panicles in the axils of leafy bracts present. Spikelets in clusters of 2—4 . . . . . 32
- 32.a. Disk-lobes lanceolate, thin, often bidentate at the apex. Leaf-sheaths at least partly winged. Nut globose or nearly so, pubescent if not too old . . . . . 6. *S. levis*
- b. Disk-lobes broadly rounded, or disk obsolete . . . . . 33
- 33.a. Contraligule with a lanceolate or oblong, 1— $1\frac{1}{2}$  cm long, scarious appendage. Secondary bracts stiff, long-exserted from the panicle . . . . . 10. *S. ciliaris*
- b. Contraligule short, either without a scarious appendage or with a band-like appendage much broader than long . . . . . 34
- 34.a. Nut depressed-globose, not or hardly umbonulate. Disk-lobes broadly ovate. Leaf-sheaths wingless . . . . . 8. *S. oblata*
- b. Nut not depressed . . . . . 35
- 35.a. Nut 3— $3\frac{2}{3}$  mm long (beak, if any, included) . . . . . 36
- b. Nut about 2 mm long . . . . . 40
- 36.a. Nut rostrate by a cylindrical or narrowly conical beak up to  $1\frac{1}{2}$  mm long, prominently trigonous, covered with weak, brownish, long hairs. Spikelets all alike, bisexual (with several male flowers besides the single female one) 1a. *S. motleyi* ssp. *rostrata*
- b. Nut erostrate, muticous or shortly mucronate or umbonate. Besides the female or bisexual spikelets strictly male ones present . . . . . 37
- 37.a. Inflorescence ample, but very open, the ultimate branches spiciform, with distant, 1—2 cm spaced clusters of spikelets. Disk narrow, triangular, each side bordered by a low but distinct swelling of the pericarp. Nut much exserted from the glumes, very smooth and shining, muticous . . . . . 12. *S. junghuhniana*
- b. Branches of the more or less dense inflorescence not spiciform, the clusters of spikelets not so strikingly spaced. Pericarp not swollen around the disk . . . . . 38
- 38.a. Disk obsolete, reduced to a narrow, triangular, minutely glandular band concrete with the nut. Nut with 3 shallow depressions at the base, smooth, acute or minutely

- umbonulate. Nut-bearing spikelets bisexual, with some to several male flowers besides the female one. Inflorescence usually copious, with several corymbiform partial panicles. Leaf-sheaths wingless . . . . . 18. *S. corymbosa*
- b. Disk well developed. Nut not depressed at the base. Nut-bearing spikelets as a rule strictly female, rarely with a single male flower besides the female one . . . . . 39
- 39.a. Nut large, usually more than 3 mm long, ovoid or broadly ovoid, obtuse, muticous, very smooth and shining. Contraligule with cartilaginous, incrassate margin, not appendaged. Leaf-sheaths winged . . . . . 11. *S. psilorrhiza*
- b. Nut at most 3 mm long, ovoid or subglobose, smooth or cancellate, umbonate or mucronate. Contraligule with scarious, brown, band-like appendage. Leaf-sheaths winged or wingless . . . . . 9. *S. terrestris*
- 40.a. (35). Spikelets all bisexual, with some to several male flowers besides the female one. Nut prominently trigonous, conical with flat sides, covered with weak, appressed, long, brown hairs. Disk thick, reflexed, not lobed, about as wide as the base of the nut . . . . . 1. *S. motleyi*
- b. Strictly male spikelets present. Nut ovoid or globose, obtusely trigonous or terete, glabrous or shortly hairy . . . . . 41
- 41.a. Leaves crowded at the base of the flowering stem, moreover 1—3 distant higher up. Base of the stems clothed with the fibrous remains of decayed leaf-sheaths. Spikelets bisexual and male. Mouth of the leaf-sheaths truncate or emarginate, sometimes slightly convex. Nut obtusely trigonous, smooth, covered with stellately arranged, short, white hairs . . . . . 2. *S. densispicata*
- b. Leaves about equally distributed along the flowering stems. No fibrous remains of decayed leaf-sheaths. Spikelets unisexual (female and male). Mouth of the leaf-sheaths with a short but distinct contraligule bordered by a brown, scarious appendage. Nut terete to obtusely trigonous, smooth to cancellate, often minutely hairy when young . . . . . 9. *S. terrestris*

**Sect. I. Browniae** (Clarke) Kern, stat. nov. — *Scleria subgen. Browniae* ('*Browneae*') Clarke, Kew Bull., add. ser. 8, 1908, 132 (type species: *Scleria brownii* Kunth).

1. *Scleria motleyi* C. B. Clarke, Philip. J. Sc. 2, 1907, Bot. 104; Ill. Cyp. 1909, t. 126, f. 1—7; Merr., En. Born. 1921, 66; En. Philip. 1, 1923, 134, excl. *var. densispicata* Clarke; ? Ohwi, Bot. Mag. Tokyo 56, 1942, 213. [T.: Borneo: *Motley* 72, 74, 152 (K)]. — *S. trigonocarpa* Ridl. [J. Str. Br. R. As. Soc. no 46, 1906, 228, nom. nud.]; Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 110, non Steud. (1855). [T.: Pahang: *Ridley s.n.* (SING)]. — *S. gonocarpa* Ridl., Fl. Mal. Pen. 5, 1925, 177. Based on *S. trigonocarpa* Ridl.

*ssp. motleyi* — Synonymy as above. — *Fig. 3a*.

Perennial with short, woody rhizome. *Stems* tufted, rather stout, erect, triquetrous, glabrous and smooth, often quite or almost hidden by the overlapping leaf-sheaths, (30—)60—100 cm by 2—5 mm. *Leaves* numerous, cauline, chartaceous, very gradually narrowed to the long, very slender, scabrous tip, glabrous or shortly pubescent, sometimes asperous on the upper side, somewhat rugulose when dry, greyish green, 5—15 mm wide; sheaths loose, triquetrous, not winged, stramineous or purplish at the base, glabrous or pubescent, the mouth emarginate on the ventral side, ciliate. *Inflorescence* narrow, elongate,

*Fig. 3.* Nuts and disks of: a. *Scleria motleyi* Clarke *ssp. motleyi*; b. *S. motleyi* Clarke *ssp. rostrata* Kern; c. *S. densispicata* (Clarke) Kern; d. *S. papuana* Kern; e. *S. brownii* Kunth; f. *S. cyathophora* Holtz.; g. *S. alta* Boeck; h. *S. levis* Retz.; i. *S. benthamii* Clarke; j. *S. oblata* S. T. Blake. — All  $\times 10$ .





15—60 cm long, consisting of a terminal panicle and several (up to 10) distant fascicles of erect, decompound lateral panicles; lower primary bracts foliaceous, much exceeding their panicles, the upper ones gradually shorter; rhachis and branchlets triquetrous, ciliate-hispid; peduncles of lateral panicles single or binate at the nodes, compressed, smooth, hardly (rarely up to 5 cm) exerted from the sheaths. *Spikelets* all bisexual, lanceolate in flower, ovate in fruit, solitary or in clusters of 2—3, shortly peduncled, brown, 3—4 mm long; *glumes* ovate, acute, shortly pubescent in the upper part, the longest c. 3 mm; male part of the spikelet c. 3 mm long; stamens 3; anthers linear, c. 2 mm long; appendage of the connective subulate,  $\frac{1}{3}$  mm long. *Disk* thick, reflexed, not lobed, about as wide as the base of the nut. *Nut* conical with flat sides, prominently trigonous, truncate at the base, acute, not or hardly beaked, smooth, shining, white or dingy purple, covered with erect, appressed, weak, ferrugineous or cinnamomeous long hairs, finally more or less glabrescent,  $1\frac{2}{3}$ —2 by  $1\frac{1}{2}$ — $1\frac{2}{3}$  mm.

**Distribution:** Widely distributed in Malaysia, but very local: Malay Peninsula, Banka, Borneo, Philippines, New Guinea.

**Ecology:** In forests, on sandy ridges, on river banks, at low and medium altitudes (up to 900 m).

**MALAY PENINSULA.** Pahang, Sungei Raub: *Machado 11533* (K, SING); Tahan River: *Ridley 2147* (K), *s.n.* (SING); Kemaman, Bukit Kajang: *Corner SF 30213* (L, SING).

**BANKA.** Lobok Besar: *Anta 441* (BO, K, L, SING); Pangkalpinang, G. Mangkol: *Bünnemeijer 2139* (BO, L).

**BORNEO.** Sarawak. Baram: *Hewitt 92* (BO, K, SAR). Brunei, jonction of Temburong and Belalang R.: *Jacobs 5644* (L). S. and E. Borneo. Banjarmasin: *Motley 72, 74* (K), *152* (CGE, K); W. Kutei: *Endert 3176* (BO, L); Nunukan: *Kostermans 9140* (BO, K, L), *Meijer 1918* (BO, K, L); E. Kutei: *Kostermans 6083* (K, L), *6653* (L); Balik Papan: *Rutten 4* (U). North Borneo. Kudat: *Fraser 107* (K), *Hose 99* (SING); Balambangan: *Kloss SF 19270* (BO, K, NY, SING); Gaya: *Ridley 9104* (K, SING); Sandakan: *Clemens 9523* (BO); *Creagh s.n.* (K); *Ramos 1129* (BO, P); Mt Kinabalu: *Clemens 27303* (BM, BO, K, L, NY); Distr. Ranau, Bukit Ataidon: *Meijer SAN 20706* (L).

**PHILIPPINES.** Palawan: *Merrill 9620* (BM, BO, K, L, NY, P, SING), *11582* (BO, L, P). Negros. Kinabkabau R.: *Edaño PNH 21910* (L). Panay. Capiz Prov., Libacao: *Martelino & Edaño BS 35496* (BM, BO, K, L, P). Basilan Islands. Isabela: *Santos 4116* (L). Mindanao. Davao Prov., Mt Galintan: *Ramos & Edaño BS 48887* (NY).

**CELEBES.** Kendari: *Kjellberg 432* (BO).

**NEW GUINEA.** W. New Guinea. Albatros bivouac: *Docters van Leeuwen 11200* (BO, K, L, SING); Both R.: *van Royen 4728* (L).

**Notes.** 1. I have not seen *Kanchira* & *Hatusima 13075* (cf. Ohwi, 1942).

2. In Blake's key to the New Guinean species of *Scleria* (J. Arn. Arb. 35, 1954, 232) the disk in *S. motleyi* is called cup-shaped, and the nut hirtellous with ferrugineous hairs. These characters are rather those of *S. papuana*. The only specimen cited by Blake is *Brass 8870* from Hollandia, which I have not seen.

**1a. ssp. rostrata** Kern, subspec. nov. [T.: Luzon: *Ramos & Edaño BS 34110* (L; dupl. in BO, NY, SING)]. — *S. trigona* Merr., Philip. J. Sc. 8, 1913, Bot. 363, ex descr. [T.: Leyte: *Wenzel 158* (n.v.)]. — *S. sorsogonensis* Elm.

ex Merr., En. Philip. 1, 1923, 134, in syn.; Elm., Leaf. Philip. Bot. 10, 1938, 3541, descr. angl. [T.: Luzon: *Elmer 15411* (BM, BO, C, FI, K, L, NY, U)]. — *S. subrostrata* Elm., Leaf. Philip. Bot. 10, 1938, 3542, in syn. — *Fig. 3b*.

Spiculae maturitate lanceolatae, 5—6 mm longae. Glumae lanceolatae, acuminatae, acutissimae vel mucronatae, sparse pilosae vel fere glabrae, purpureae, usque ad  $4\frac{1}{2}$  mm longae. Spicularum pars mascula  $4\frac{1}{2}$  mm longa. Nux rostrata, rostro usque ad  $1\frac{1}{2}$  mm longa. Antherae  $2\frac{1}{2}$  mm longae, connectivo in appendicem ovatam producto. Inflorescentiae foliorumque vaginae plerumque purpureae.

PHILIPPINES. Babuyanes. Camiguin Island, Mt Mapolapola: *Edaño BS 79372* (NY). Luzon. Isabela Prov., San Mariano: *Ramos & Edaño BS 46905* (NY, SING); Prov. of Nueva Vizcaya, Dupax: *MacGregor BS 14230* (BM, K, P); Prov. of Pangasinan, Mt San Isidro, Labrador: *Fénix BS 29896* (P); Zambales Prov., Mt Tapolao: *Ramos & Edaño BS 44761* (NY); Bulacan Prov., Angat: *Ramos & Edaño BS 34110* (BO, L, NY, SING); Prov. of Rizal, Mt Lumutan: *Ramos & Edaño BS 29706* (K, NY, P, SING); Prov. of Tayabas, Mt Cadig: *Yates BS 25500* (BO, NY, P), *BS 25552* (P); Camarines Prov., Paracale: *Ramos & Edaño BS 33583* (BO, L); Prov. of Sorsogon, Mt Bulusan: *Elmer 15411* (BM, BO, C, FI, K, L, NY, P, U); Apayao Subprov., Mt Magnos: *Edaño PNH 19768* (L). Catanduanes: *Ramos BS 30426* (BO, NY, P). Biliran Island. Mt Suero: *Sulit PNH 21580* (L).

Notes. 1. Typical specimens of this endemic of Luzon and adjacent islands make the impression of a separate species. As especially the length of the beak of the nut varies considerably, I prefer to treat it as a geographical race (subspecies) of the much more widely distributed *Scleria motleyi*.

2. I have not seen *Wenzel 158*, the type collection of *Scleria trigona* Merr.; to judge from the description it represents a state of *ssp. rostrata* with less pronounced beak of the nut.

2. *Scleria densispicata* (C. B. Clarke) Kern, stat. nov. Based on *S. motleyi* var. *densi-spicata* C. B. Clarke. — *S. motleyi* C. B. Clarke var. *densi-spicata* C. B. Clarke, Philip. J. Sc. 2, 1907, Bot. 104; Merr., En. Philip. 1, 1923, 134. [T.: Luzon: *Loher 803* (K)]. — *Fig. 3c*.

Perennial with short, woody rhizome. Stems tufted, slender, erect, triquetrous, glabrous and smooth, naked in the lower part, 30—100 cm by 1—3 mm, the base densely covered with the decayed, finally fibrous, dull brown remains of old leaf-sheaths. Leaves numerous, in a basal rosette and moreover 1—3 distant on the stem (their sheaths not overlapping), chartaceous, very gradually narrowed to the long, setaceous tip, glabrous or slightly pubescent, scabrid on the margins, shining, 5—7 mm wide; sheaths of the stem-leaves and bracts narrow, triquetrous, not winged, stramineous, glabrous, the mouth truncate or emarginate, ciliate, sometimes somewhat convex. Inflorescence narrow, elongate, 15—40 cm long, consisting of a terminal panicle and several (up to 5) distant fascicles of erect, compound lateral panicles; lower primary bracts foliaceous, much exceeding their panicles, the upper ones gradually shorter; secondary bracts setaceous, long and standing out from the panicles; branchlets triquetrous, ciliate-hispid; peduncles of lateral panicles solitary or binate at the nodes, compressed, scabrid, 0—5 cm exserted from the sheaths. Spikelets male and bisexual, in dense clusters of (3—)5—7, sessile or almost so, brown, the male ones lanceolate, 4—5 mm long, the bisexual ones ovate in fruit,  $3\frac{1}{2}$ — $4\frac{1}{2}$  mm long, the male part 3—4 mm; glumes ovate, acute, sparsely hairy; stamens 3;



anthers linear, c. 2 mm long; appendage of the connective subulate,  $\frac{2}{3}$  mm long, smooth or somewhat scabrid. Cupula urceolate, with brown margin, thick, spongy. Disk thin, reflexed, not lobed, narrower than the base of the nut. Nut ovoid, with somewhat convex sides, obtusely trigonous, rounded at the base, acuminate, shortly beaked (beak c.  $\frac{1}{3}$  mm long), smooth, white or finally discoloured, covered with bundles of patent, stiff, whitish, short hairs, finally more or less glabrescent, c. 2 by  $1\frac{1}{3}$ — $1\frac{1}{2}$  mm.

**Distribution:** Only known from Luzon.

**Ecology:** In forests at low and medium altitudes, ascending to 800 m.

**PHILIPPINES.** Luzon. Prov. of Pampanga, Mt Arayat: *Loher* 803 (K); *Ramos* BS 22441 (K, L, NY, P); Ilocos Norte Prov., Burgos: *Ramos* BS 32845 (BO, L, P); Zambales Prov., Mt Tapolao: *Ramos* & *Edaño* BS 44754 (BO, NY, SING). According to Merrill, En. Philip. 1, 1923, 134, also in Prov. of Nueva Vizcaya.

**Note.** Clarke distinguished this taxon by the dense inflorescences with long, setaceous secondary bracts standing out from the panicles. In my opinion it certainly deserves specific rank, as the shape and the indument of the nut are also very different from those in *Scleria motleyi*.

3. *Scleria papuana* Kern, sp. nov. — ? *Scleria motleyi* (non Clarke) S. T. Blake, J. Arn. Arb. 35, 1954, 225. — Fig. 3d, 4.

Herba perennis, sat valida, 1— $1\frac{1}{2}$  m alta. Rhizoma lignosum, breve. Culmi fasciculati, erecti vel oblique erecti, acute triquetri, faciebus plani, glabri vel sparse pilosi, laeves, distanter foliigeri, 2—3 mm crassi, basi vaginis brunneis demum in fibras dissolutis obtecti. Folia basalia numerosa, glaucescentia, chartacea, plana vel in sicco marginibus revoluta, glabra vel subtus minute pubescentia, 5—10 mm lata, marginibus antrorse scabridis; folia caulina 1—2, laminis brevioribus, vaginis arctis, acute triquetris, exalatis, laevibus, purpureis, antice plus minusve pubescentibus, 3—4 cm longis, ore truncatis vel leviter convexis vel concavis, ciliolatis. Inflorescentia angusta, elongata, laxa, 30—60 cm longa, e paniculis pluribus (usque ad 7), distantibus, stricte erectis, oblongis, compositis constructa, pedunculis solitariis vel binatis e bractearum vaginis vix exsertis, ramis triquetris laevibus vel scabridis; bractee primariae inferiores foliis caulinis similes, elongatae, usque ad 45 cm longae, superiores gradatim breviores; bractee secundariae inconspicuae, setaeae. Spiculae bisexuales praevallidae, spiculis nonnullis masculis (semper?) intermixtis, solitariae vel 2—3 aggregatae, sessiles vel breviter pedunculatae, maturitate ovatae, brunneae, 3— $3\frac{1}{2}$  mm longae; glumae partis femineae 4—6, chartaceae, ovatae, acutae, ciliolatae, dorso minute pubescentes vel subglabrae; pars mascula pluriflora, glumis membranaceis, lanceolatis; stamina 3, antheris linearibus c.  $1\frac{1}{2}$  mm longis, connectivo in appendicem  $\frac{1}{3}$  mm longam scabram producto. Cupula patelliformis. Discus membranaceus, erectus, niveus, nuce angustior, distincte trilobatus, lobis latis obtusissimis undulatis. Nux ovoidea, obtuse trigona, lateribus paullo convexis, basi rotundata, apiculata, laevis, nitida, lactea, demum sordida, fasciculis sparsis pilorum breviorum albidorum vel ferrugineorum obsita, demum plus minusve glabrescens, 2 mm longa,  $1\frac{1}{3}$ — $1\frac{2}{3}$  mm lata.

Fig. 4. *Scleria papuana* Kern — a. Habit,  $\times \frac{1}{2}$ ; b. spikelet,  $\times 7\frac{1}{2}$ ; c. nut,  $\times 15$ . — From Brass 26047.



**Typus:** Papua, Fergusson Islands: *Brass* 26047 (L; dupl. in K).

**NEW GUINEA.** W. New Guinea. Rouffaer River, riverbank, 250 m: *Docters van Leeuwen* 10246 (BO, L); Humboldt Bay, forest glades, 10 m: *Gjellerup* 982 (BO, L). **Papua.** Fergusson Island, secondary rain-forest, 150 m: *Brass* 26047 (K, L).

**Note.** This species and the preceding one are only known from a few collections. Apparently they are closely related, as they agree in habit (many leaves in a basal rosette, stems with a few distant leaves only, base of the plant covered with decayed leaf-sheaths), and in the shape and hairiness of the nut. They differ in the distribution of sexes (*S. densispicata* has many strictly male spikelets), in the length of the secondary bracts, and in the very dissimilar disk under the nut, characters estimated as very important for specific delimitation in the genus. For this reason the two are treated here on specific level; possibly additional collections may show the necessity to regard them as geographical races of one single species.

**4. *Scleria brownii* Kunth, En. 2, 1837, 349 ('*brownei*'); Steud., Syn. 2, 1855, 173; Boeck., Linnaea 38, 1874, 453; F. v. M., Fragm. Phyt. Austr. 9, 1875, 21; Benth., Fl. Austr. 7, 1878, 429; Domin, Bibl. Bot., Heft 85, 1915, 487, incl. varr.; Kük., Bot. Jahrb. 70, 1940, 464.** Based on *S. distans* R. Br. — *S. distans* R. Br., Prodr. 1810, 240, non Poir. (1806). [T.: Littora N. Holl. intra tropicum: *R. Brown* 6070 (BM)]. — *S. pallidiflora* Boeck., Flora 58, 1875, 119. [T.: Queensland, Gladstone: *Am. Dietrich* 724 (HBG)]. — *Fig. 3e.*

Perennial with short, nodose, fuscous rhizome. *Stems* slender, tufted or approximate on the shortly creeping rhizome, erect, triquetrous, retrorsely hispid-scabrid on the angles to almost smooth, 20–60 cm by 1–1½ mm. *Leaves* rigid, narrowly linear, canaliculate, with revolute margins, acute, glabrous, more or less scabrid on the margins, 2–3 mm wide; sheaths narrow, not winged, often more or less pubescent, the lower ones purplish; contraligule absent (mouth of the sheaths truncate or almost so, villous). *Inflorescence* narrow, consisting of 2–4 distant to approximate, small, shortly peduncled clusters, 3–12 cm long; peduncles single or binate at the nodes; primary bracts foliaceous, erect, similar to the leaves, as long as or overtopping the inflorescence, the upper ones gradually shorter; secondary bracts inconspicuous. *Spikelets* bisexual and male (see note), 4–6 mm long; male spikelets several-flowered; stamens 3; anthers linear, 2–2½ mm long; appendage of the connective oblong-ovate, smooth or slightly scabrid; bisexual spikelets with several male flowers; glumes ovate-lanceolate, acute or cuspidate, ferrugineous with green keel. *Disk* 3-lobed, whitish; lobes membranous, broad, truncate, undulate. *Nut* small, much shorter than the glumes, fragile, globular to ovoid-ellipsoid, obtusely or obscurely trigonous, apiculate (the short beak conical, brown or blackish), more or less granular-tuberculate, at first pubescent, finally glabrescent, white, 2–3 by 1⅔ mm.

**Distribution:** Australia (N. Territory, Queensland), New Caledonia, Tonga; in Malaysia a few times collected in New Guinea.

**NEW GUINEA.** W. New Guinea. Humboldt Bay: *Beccari s.n.* (FI). NE. New Guinea. Kalasa, mission hill, hole in rock, 1600 ft: *Clemens* 7903 (B). **Papua.** Kanosia, open savannah land, 50 ft: *Carr* 11181 (BM, L, NY, SING).

**Notes.** 1. The bisexual spikelets are mostly prevalent, but in one of the Australian specimens in the Leyden Herbarium I found only strictly male spikelets. Is there a tendency to dioecism in this species?



2. *Scleria mackaviensis* Boeck., Flora 58, 1875, 119; Clarke, Ill. Cyp. t. 125, f. 3—5; Domin, Bibl. Bot., Heft 85, 1915, 488 [T.: *Am. Dietrich* 720 (HBG)], is very near to *S. brownii* and possibly not specifically distinct. It differs by the presence of an up to 5 mm long, tongue-shaped contraligule and the longer, more cylindrical, often curved, white (not brown) beak of the nut, and is usually somewhat stouter, with broader leaves. In the few Australian and New-Caledonian collections I have referred to *S. mackaviensis*, these characters are not always as pronounced as in the type-collection; therefore it seems doubtful whether a line can be drawn between *S. brownii* and *S. mackaviensis*. In specimens from Tonga (*Yuncker* 15849) the nuts are perfectly smooth and the contraligule short.

The specimens of *Am. Dietrich* 725 (BM, HBG), labelled "*Scleria novae-hollandiae*, O. Boeckeler det." (not in Boeckeler's handwriting) belong to *S. mackaviensis*.

3. *Scleria neocaledonica* Rendle, J. Linn. Soc., Bot. 45, 1921, 262, is also near to *S. brownii*. I have only seen a few poor specimens which might answer Rendle's description. They are much stouter than *S. brownii*, with broad, more or less hairy leaves, somewhat larger spikelets, the nut rather densely covered with brown hairs, the beak of the nut densely hairy, and are moreover remarkable by the numerous, long, brown sheaths surrounding the base of the stems.

*Scleria tryonii* Domin, Bibl. Bot., Heft 85, 1915, 487, seems to be very near to *S. neocaledonica*, if not conspecific with it. Rendle describes the hypogynous disk of *S. neocaledonica* as being entire, Domin that of *S. tryonii* as being 3-lobed.

4. The specimen in the Hamburg Herbarium of *Dietrich* 724, "Nova Holl. Queensland, Gladstone", annotated by Boeckeler "*Scleria pallidiflora* n. sp." is certainly conspecific with the type of *Scleria brownii*.

5. *Scleria cyathophora* Holtt., Gard. Bull. Sing. 11, 1947, 294. [T.: Malay Peninsula: *Henderson* SF 24042 (SING; dupl. in BO, K)]. — *Fig. 3f*.

Perennial with shortly creeping, woody, nodose rhizome clothed with brown scales. *Stems* very slender, erect, triquetrous, glabrous and smooth, leafy throughout, up to 100 cm by 2—3 mm. *Leaves* rigid, flat or canaliculate, with revolute margins when dry, very gradually narrowed to the acute tip, glabrous, smooth except for the retrorsely scaberrulous tip, greyish green, 3—4 mm wide; sheaths narrow, triquetrous, not winged, puberulous; contraligule very short, broader than long, rounded, hairy. *Inflorescence* narrow, 5—15 cm long, consisting of a terminal panicle and about 3 short, erect lateral ones, the latter single or binate at the nodes, erect, 2—3 cm long, with very short branches; peduncles not or but slightly exerted from the sheaths; primary bracts similar to the leaves, the lowest one overtopping the inflorescence; secondary bracts subulate. *Spikelets* bisexual or female, and male, reddish brown, shortly peduncled, 3—3½ mm long; male spikelets lanceolate; stamens 3 (or in some flowers 2); anthers c. 2 mm, with conical-subulate, scabrid appendage of the connective; nut-bearing spikelets ovoid, with a sterile or male flower besides the terminal female one; glumes ovate, acute, minutely pubescent. *Disk* cyathiform, thin, 3-lobed, about ½ the length of the nut, yellowish or rufidulous; lobes appressed, ovate-triangular, plicate, irregularly denticulate. *Nut* small, ovoid-conical, obtusely but

distinctly trigonous, somewhat acuminate, slightly rugulose, white, hirtellous with ferruginous hairs, c. 2 by  $1\frac{1}{2}$  mm.

**Distribution:** Only known from a few localities in W. Malaysia, probably often overlooked.

ARCH. IND. Without exact locality: *Waitz s.n.* (L).

BANKA. Lobok Besar, marsh with *Melaleuca*, 5 m: *Kostermans & Anta 374* (BO, L).

MALAY PENINSULA. Pahang. Tasek Bera, in shallow water, low: *Henderson SF 24042* (BO, K, SING).

W. BORNEO. Andjongan, N of Pontianak, along road, sandy soil, among *Sphagnum*: *Polak 683* (BO, K, L).

**Notes.** 1. Holtum placed *Scleria cyathophora* next to *S. motleyi*, obviously because of its trigonous nuts, and I have followed him by placing the two species in the same section. Indeed, *S. cyathophora* has several characters in common with the group to which *S. motleyi* belongs, especially with *S. papuana*. However, in the other species of this group the spikelets are either all bisexual or the nut-bearing ones have a well-developed, several-flowered male part, whereas in *S. cyathophora* this part is reduced to a single male or frequently sterile flower. Also the resemblance in habit to the other species is rather slight.

2. *Scleria alta* Boeck., *Linnaea* 38, 1874, 485 (fig. 3g), from Khasia, is apparently a near ally of *S. cyathophora*. The structure of the spikelets is the same, the hypogynous disks strikingly similar, and the habit of *S. alta* greatly approaches that of *S. cyathophora*. *Scleria alta* can easily be distinguished by the winged middle leaf-sheaths (wings denticulate-scabrous), the very long secondary bracts, the larger, globose, slightly depressed, cancellate nuts, and by the peculiar contraligule, which is bordered by a broad, chartaceous, yellowish, glabrous appendage.

3. For *S. alta* (non Boeck.) Camus, *Fl. Gén. I.-C.* 7, 1912, 166, see *S. psilorrhiza*, p. 176.

**Sect. II. *Scleria*** (type species *Scleria flagellum-nigrorum* Berg., type species of the genus). — *Scleria* sect. *Scleria* Endl., *Gen. Plant.* 1836, 112, p.p. — *Scleria* subgen. *Scleria* Clarke in Hook. f., *Fl. Br. Ind.* 6, 1894, 686, p.p. — *Scleria* subgen. *Euscleria* Clarke in Thiseit.-Dyer, *Fl. Cap.* 8, 1898, 294; Kew Bull., add. ser. 8, 1908, 133; Cherm. in Humbert, *Fl. Madag.*, fam. 29, 1937, 254, p.p. — *Scleria* sect. *Paniculatae* Boeck. ex Pax in E. & P., *Pfl. Fam.* II, 2, 1888, 121, p.p.; Dalla Torre & Harms, *Gen. Siph.* 1900, 35. — *Scleria* sect. *Elatae* Clarke in Hook. f., *Fl. Br. Ind.* 6, 1894, 689; Cherm. in Humbert, *Fl. Madag.*, fam. 29, 1937, 257 (type species *Scleria elata* Thwaites).

6. *Scleria levis* Retz., *Obs.* 4, 1786, 13; S. T. Blake, *J. Arn. Arb.* 35, 1954, 226. [T.: Ex India Orientali (LD)]. — *S. zeylanica* Poir., *Enc. Méth.* 7, 1806, 3. [T.: Ceylon: *Sonnerat* (P.)]. — *S. hebecarpa* Nees in Wight, *Contr.* 1834, 117; Kunth, *En.* 2, 1837, 357; Steud., *Syn.* 2, 1855, 169; Boeck., *Linnaea* 38, 1874, 478; Ridl., *J. Str. Br. R. As. Soc.* no 23, 1891, 17; Clarke, *Fl. Br. Ind.* 6, 1894, 689; *J. Linn. Soc.*, Bot. 34, 1898, 99; *ibid.* 36, 1903, 264; Philip. *J. Sc.* 2, 1907, Bot. 105; Ridl., *Mat. Fl. Mal. Pen.* (Monoc.) 3, 1907, 113; *J. Str. Br. R. As. Soc.* no 59, 1911, 225; Camus, *Fl. Gén. I.-C.* 7, 1912, 166; Stapf & Turr. in Gibbs, *J. Linn. Soc.*, Bot. 42, 1914, 182; Merr., *En. Born.* 1921, 66; *En. Philip.* 1, 1923, 133, excl. *BS 29679*; Kük., *Bot. Jahrb.* 59, 1924, 58;

Ridl., Fl. Mal. Pen. 5, 1925, 179; Ohwi, Bot. Mag. Tokyo 56, 1942, 212; Mem. Coll. Sc. Kyoto Imp. Un. B 18, 1944, 6; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 59. [T.: in Ceylona insula: *Macrae* (CGE)]. — *S. scrobiculata* (non Nees) Mor., Syst. Verz. 1846, 98, p.p. (quoad Zollinger 349); Zoll., Syst. Verz. 1, 1854, 61. — *S. pubescens* Steud. [ex Zoll., Syst. Verz. 1, 1854, 61, nom. nud.]; Syn. 2, 1855, 168; Camus, Fl. Gén. I.-C. 7, 1912, 167; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 59. [T.: Java: Zoll. *Mor. ex parte Hrbr. n. 377* (P)]. — *S. japonica* Steud., Syn. 2, 1855, 169; Miq., Ann. Mus. Bot. Lugd. Bat. 2, 1865, 146; Camus, Fl. Gén. I.-C. 7, 1912, 168. [T.: Japonia: *Herb. Goering n. 347* (P)]. — *S. sumatrensis* var. *pubescens* (Steud.) Miq., Fl. Ind. Bat. 3, 1856, 344. Based on *S. pubescens* Steud. — *S. vestita* Boeck., Linnaea 38, 1874, 482. [T.: Hongkong: *Hance 1157* (K)]. — *S. dictrichiae* Boeck., Flora 58, 1875, 121. [T.: Port Mackay, N. Holl.: *Am. Dietrich* (726) (BM, HBG)]. — *S. wichurai* Boeck., Bot. Jahrb. 5, 1884, 510, ex descr. [T.: Manila: *Wichura* (n.v.)]. — *S. chinensis* (non Kunth) Clarke, Philip. J. Sc. 2, 1907, Bot. 105, p.p. (quoad *Loher 804*). — *S. hebecarpa* var. *pubescens* (Steud.) Clarke, Fl. Br. Ind. 6, 1894, 689; J. Linn. Soc., Bot. 34, 1898, 99; *ibid.* 36, 1903, 265; Merr., En. Philip. 1, 1923, 133. Based on *S. pubescens* Steud. — ? *S. hebecarpa* f. *pilosa* Valck. Sur., Nova Guinea 8, 1912, 712. [T.: Nova Guinea: *Von Roemer 672* (BO, fide Valck. Sur., n.v.)] — *Fig. 3h.*

Perennial with woody, shortly creeping, thick, nodose rhizome. *Stems* approximate, slender, erect, triquetrous, scabrid on the angles, glabrous to softly villous, 30–90 cm by 1–3 mm. *Leaves* equally distributed along the stem, rigid, linear, gradually narrowed to the acutish tip, glabrous to densely pubescent with long, white hairs, scabrid on the margins in the upper part, dull green, 3–8 mm wide; sheaths narrow, triquetrous, narrowly to broadly winged (at least part of them), the wings retrorsely scabrous on the margin; contraligule short, semi-orbicular, densely hirsute, on the top (always?) with a short (sometimes up to 2 mm long), triangular or ovate scarious appendage. *Inflorescence* narrow, consisting of a terminal panicle and 1–2 smaller lateral ones; axes scabrid, or villous with long white hairs; terminal panicle oblong, 5–12 cm long, with obliquely erect branches; lateral panicles few-branched, often almost spike-like, thin and loose, their peduncles exserted from the leaf-sheaths, compressed, scabrid; primary bracts foliaceous, overtopping the inflorescence, secondary ones setaceous, longer than their branches. *Spikelets* unisexual, in clusters of 2–4; male spikelets oblong-lanceolate, 3–4 mm long; stamens 3; anthers linear, c. 2 mm long, with a short purplish appendage of the connective; female spikelets ovate, 4–6 mm long, a sterile glume (vestige of the male part) usually present; glumes ovate, acute or mucronulate. *Disk* deeply 3-lobed; lobes thin, lanceolate, appressed to the nut, acute, often bidentate at the top, brown, 1–1½ mm long. *Nut* globose or ovoid-globose, terete or obscurely trigonous, not exserted from the glumes, apiculate, smooth or slightly transversely rugulose, pubescent, ultimately glabrescent, shining, white, 2–2½ mm long and wide.

*Distribution:* Widely distributed from Ceylon and India to S. China and Japan, and throughout Malaysia to Queensland and New Caledonia.

*Ecology:* In open forests (often in teak-forests), brushwood, savannahs, fallow rice-fields, etc., at low and medium altitudes, up to 1500 m.

*Vernacular names:* *Rumput belidang*, Mal., *djukut ilat*, Sund.,



kerissan, Jav., sianit, C. Sum., teteles, Gaju, pedugan, Bawean, tentaripa, Talaud; Philip.: daat, Tag.

SUMATRA and adjacent islands: Bal 27; Bünneimeijer 227, 3714, 4030; Gusdorf 149; Japing bb 151; Jochems 3133; Koorders 21551; Lörzing 6469, 6657, 7923, 8596, 8959, 9122; Rahmat si Boeea 3467, 3662; Roeloffs bb 12334; Rutten-Kooistra 20, 51; Surbeck 273; Verboom 25; De Vogel s.n.

MALAY PENINSULA: Burkill SF 4628; Corner SF 37595; Curtis 1795, 1828; Henderson SF 18300, SF 24072, SF 38228; Holtum SF 38283; Hose 67; Hume 7744; Lemann s.n.; Machado 11536; Mohd Nur SF 31352; Nauen SF 35862, SF 37480, SF 38180; Ridley 2143, 5811, 8166, 11536, 14353; Seimund 279; Symington 21332, 21435, 22974; Teruya 2568.

JAVA and adjacent islands: Backer 696, 6453, 22068, 23555, 27064, 30365, 36959; Bakhuiizen van den Brink 5373, 5488, 6918; Bakhuiizen van den Brink fil. 916, 2938; Becking s.n.; den Berger 273; Beumée A 263, A 538, A 596, 3541, 3720, 4902, 5008, 5074, 5164, 5224, 5392, 5487; de Boer & Wolff von Wülffing 4232; Buwalda 2799, 3301; Dorgelo 1776 p.p.; Franck 92; Hallier 562a, 567; Harmsen 91; Hemken 4; Horsfield s.n.; Junghuhn s.n.; Karta 123; Kern 8245; Kievits 3305; Koorders 21929, 33544, 40810, 41464, 42503, 44107; van Ooststroom 12578; van Steenis 4756, 5347, 6671, 7476, 11384, 11787, 11788, 11789, 12526; Thorenaar 298; Vorderman 124; de Vries 59; Wisse 687; de Wit 4199; Wolff von Wülffing 3926; Zollinger 349, 377 p.p.

LESSER SUNDA ISLANDS: Monod de Froideville 1934; van Steenis 18134.

BORNEO and adjacent islands: Darnton 23; Gibbs 2774; Henderson SF 20213, SF 20236; Lenart 6; van Loenen 1; Motley 794; van Steenis 991; Hub. Winkler 2972.

PHILIPPINES: Conklin PNH 17597; Edaña PNH 11587; Loher 804; Ramos & Edaña BS 30957, BS 37468, BS 39194, BS 49549; Soriano PNH 16407.

CELEBES and adjacent islands: Bünneimeijer 10706; Kjellberg 436; Lam 3387; van Steenis 10374.

MOLUCCAS: A. J. Jansen s.n.; Chr. Smith s.n.

NEW GUINEA and adjacent islands: Miss Blackwood 165; Brass 5996, 7691, 7877, 8264, 8715, 27234; Clemens 7958a, 8152; Crutwell 180; Fryar NGF 3607; 't Hart & van Leeuwen M 11; Kanehira & Hatsumi 13202; Pleyte 908; Robbins 47; Saunders 8; Schlechter 18458; Womersley, Floyd & McKee 6190.

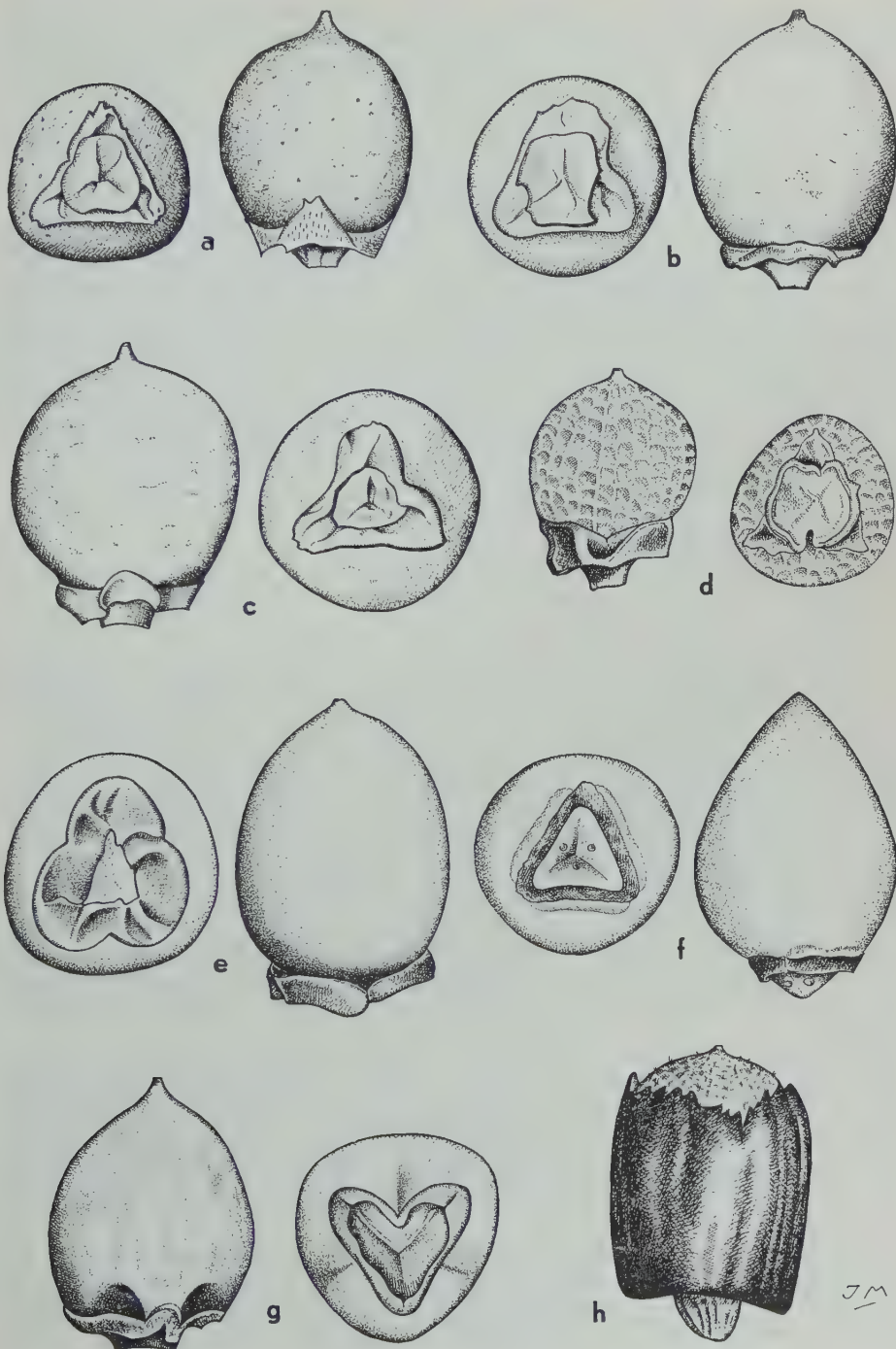
Notes. 1. A small and slender species among its relatives and for this reason sometimes confused with *S. lithosperma*, but easily distinguishable from that species by the presence of a well-developed hypogynous disk.

2. Clarke (1907) referred Loher 804 to *S. chinensis* Kunth, probably on account of the small but distinct scarious appendage of the contraligule. However, *S. chinensis* Kunth is a superfluous name for *S. ciliaris* Nees, a species with short, rounded lobes of the disk.

7. *Scleria benthamii* C. B. Clarke, Kew Bull., add. ser. 8, 1908, 58. [T.: Brisbane R.: F. von Müller 61 (K)]. — *S. tessellata* (non Willd.) Benth., Fl. Austr. 7, 1878, 430, excl. var. *debilis*. — *S. khasiana* C. B. Clarke in Hook. f., Fl. Br. Ind. 6, 1894, 692; J. Linn. Soc., Bot. 34, 1898, 102, non Boeck. (1890). [T.: Khasia: Clarke 40052, 44613, 44683, 44798 (K)]. — Fig. 3i.

Perennial. Stems slender, tufted, erect, triquetrous, glabrous and smooth, (30—)45—120 cm by 1—3 mm. Leaves herbaceous, flat, exactly linear, rather abruptly narrowed to the obtusish tip, glabrous to more or less villous by long white hairs, scabrid on the margins towards the apex, otherwise smooth, (2—)3—7 mm wide; sheaths triquetrous, narrow, wingless to rather broadly

Fig. 5. Nuts and disks of: a. *Scleria terrestris* (L.) Fass. (*S. radula* Hance); b. ditto (*S. haematostachys* Boeck.); c. ditto (*S. exaltata* Boeck.); d. *S. ciliaris* Nees; e. *S. psilorrhiza* Clarke; f. *S. junghuhniana* Boeck.; g. *S. poaeiformis* Retz.; h. *S. sumatrensis* Retz. — All  $\times 10$ .



winged, smooth, villous by patent or retrorse hairs to glabrous except for the very short, rounded or truncate contraligule, which is bordered by a narrow membranous band. *Inflorescence* narrow, consisting of a terminal, lanceolate panicle and 1—2 distant fascicles of lateral panicles, the terminal panicle  $1\frac{1}{2}$ —5 cm long, the lateral ones smaller, single or binate at the nodes, erect, their peduncles short (or the lowest up to 5 cm exerted from the sheath), smooth, compressed; primary bracts erect, similar to the leaves, the uppermost one as long as or slightly overtopping the inflorescence, secondary bracts setaceous, often slightly recurved. *Spikelets* unisexual, shortly peduncled; male spikelets linear-lanceolate, 3— $4\frac{1}{2}$  mm long; stamens 3; anthers linear, c. 2 mm long, with reddish, scabrid appendage of the connective; female spikelets 4—5 mm long, the male part reduced to a small empty glume or absent; glumes ovate, acute or mucronulate, stramineous with purplish or brownish sides, glabrous, smooth. *Disk* shallowly lobed, triangular, appressed to the nut and about as wide as it, thick, with c.  $\frac{1}{3}$  mm broad, reflexed margins, yellowish, the lobes with a short erect, subulate mucro. *Nut* somewhat shorter than to about as long as the glumes, ovoid, obtusely trigonous, not apiculate, rugulose or obscurely cancellate, sparsely pubescent, finally glabrescent, glossy, white,  $2\frac{1}{3}$ — $2\frac{1}{2}$  by  $2$ — $2\frac{1}{5}$  mm.

*Distribution*: Khasia, Thailand, Indo-China, Queensland: in Malaysia once collected in the Philippines.

*Ecology*: In dry open grasslands, 1500 m.

*PHILIPPINES*. Luzon. Prov. of Benguet, Baguio to Ambuklao: Merrill 4370 (BO, K, NY).

*Notes*. 1. *Scleria thomsoniana* Boeck., Linnaea 38, 1874, 479, and *S. khasiana* Boeck., Cyp. Nov. 2, 1890, 29, were based on the same collection, viz *Scleria* sp. 12, Herb. Ind. Or., Hook. f. & Thoms. As the latter binomial is nomenclaturally superfluous, Clarke used the same binary combination for a quite different species. This procedure is contrary to the present-day Code, and Clarke's name is illegitimate. However, there is no need for a new name, as *Scleria benthamii* from Queensland is undoubtedly conspecific with *S. khasiana* Clarke. The type of *S. benthamii* is practically glabrous, that of *S. khasiana* softly hairy, but glabrous specimens have been collected, e. g. Kerr 3358 from N. Thailand, Doi Suthep, which was labelled by Turrill "*Scleria khasiana*, C. B. Cl., var. *glaberrima* Turrill var. nov." As far as I know this name has not been published. Also in *S. levis*, which is very similar to *S. benthamii* and may be its nearest ally, the hairiness varies from practically glabrous to densely villous.

2. In Kew Bull., add. ser. 8, 1908, 133, Clarke placed *S. benthamii* under the heading "*vaginae trialatae*" and *S. khasiana* under "*vaginae not aut vix alatae*". When I was at Kew I failed to note whether or not the sheaths in the specimens cited by Clarke are winged. A duplicate of Clarke 44798 (syntype coll., BM) has wingless sheaths indeed, but a duplicate of Clarke 44683 (also syntype coll., C) has distinctly winged middle leaf-sheaths, as has the type of *S. benthamii*.

3. Both *Scleria benthamii* and *S. khasiana* are especially characterized by the peculiar shape of the disk reminding one of a tricorn hat. This type of disk is also found in *S. tricuspidata*, but this is an annual with tuberculate, distinctly apiculate nut (see also under this species).



4. *Scleria benthamii* is also found in Thailand and Indo-China. The only Malaysian collection is rather poor: ripe nuts I found in the specimen at Kew; they leave no doubt as to the identity.

8. *Scleria oblata* S. T. Blake, *Blumea* 11, 1961, 219. [T.: SE. Celebes: *Elbert 3078* (BRI; dupl. in L)]. — *S. levis* (non Retz.) Willd., *Sp. Pl.* 4, 1805, 314 ('*laevis*'); Nees in Wight, *Contr.* 1834, 117; Kunth, *En.* 2, 1837, 342; Mor., *Syst. Verz.* 1846, 98; Zoll., *Syst. Verz.* 1, 1854, 61; Steud., *Syn.* 2, 1855, 169; Miq., *Fl. Ind. Bat.* 3, 1856, 341, incl. *f. β*; Thwaites, *En. Pl. Zeyl.* 1864, 354; Boeck., *Linnaea* 38, 1874, 512; Clarke, *Fl. Br. Ind.* 6, 1894, 694; J. Linn. Soc., *Bot.* 34, 1898, 103; Ridl., *J. Str. Br. R. As. Soc.* no 23, 1891, 18; *ibid.* no 46, 1906, 228; Mat. *Fl. Mal. Pen. (Monoc.)* 3, 1907, 111; Hochreutiner, *Bull. N. Y. Bot. Gard.* 6, 1910, 263; Winkl., *Bot. Jahrb.* 44, 1910, 526; Camus, *Fl. Gén. I.-C.* 7, 1912, 169; Merr., *En. Born.* 1921, 66; *En. Philip.* 1, 1923, 133, excl. *Merrill 8380*; Ridl., *Fl. Mal. Pen.* 5, 1925, 177; Uitt. in Backer, *Bekn. Fl. Java* (em. ed.) 10, 1949, fam. 246, 57. — *Fig. 3 j*.

Nearly glabrous and smooth perennial, with woody, shortly creeping rhizome. *Stems* approximate, rather slender, erect, triquetrous, smooth and glabrous, 60—100 cm (in scrub sometimes sprawling and taller) by 2—3 mm. *Leaves* rigid, patent, linear, gradually narrowed to the acutish tip, somewhat puberulous on the upper side near the base, otherwise glabrous, minutely scabrid especially in the upper part, with revolute margins, 4—9 mm wide, the upper ones distant, the middle ones more approximate (but not whorled); sheaths narrow, triquetrous, not winged, smooth, usually puberulous at the top; contraligule very short, much broader than long, obtuse, ciliate, with a narrow scarious margin. *Inflorescence* rather narrow, rigid, consisting of a terminal partial panicle and 2—5 lateral ones, 15—25 cm long, 3—5 cm wide; axes glabrous, smooth or nearly so; partial panicles erect, dense, contiguous or the lower ones somewhat distant, compound, pyramidal; peduncles solitary or sometimes binate, shortly exserted from their sheaths; primary bracts foliaceous, overtopping the inflorescence, secondary ones small, setaceous. *Spikelets* unisexual, in clusters of 2—3, with purplish brown glumes; male spikelets distinctly peduncled, slightly curved, oblong-lanceolate,  $3\frac{1}{2}$ —4 mm long; stamens 3; anthers linear,  $1\frac{1}{2}$ —2 mm long, with a conical, smooth, purplish appendage of the connective; female spikelets ovate, 4— $4\frac{1}{2}$  mm long, the male part reduced to a single glume sometimes with vestigial stamens in its axil; glumes broadly ovate, acute or apiculate, minutely ciliolate. *Disk* deeply 3-lobed, lobes firm, broadly ovate, obtuse, appressed to the nut, entire or somewhat denticulate at the top, pale, greenish or reddish striolate,  $1-1\frac{1}{4}$  mm long, sinuses acute. *Nut* shorter than the glumes, depressed-globose, not or hardly umbonulate, glabrous and smooth, at first blackish, shining white when mature, c. 2 mm by  $2\frac{1}{2}$ — $2\frac{4}{5}$  mm.

*Distribution*: Ceylon; from Assam through Burma and Thailand to Indo-China and S. China; in Malaysia: Sumatra, Banka, Malay Peninsula, W. Java, Borneo, Philippines, SE. Celebes.

*Ecology*: In open wet places: road-sides, light forests, brushwood, at low altitudes, up to 700 m (according to Merrill in the Philippines up to 1200 m).

*Vernacular names*: *Kerisan*, Sum. E. C., *sialit dudok*, *seranek*, *sesayok*, Mal. Pen., *badang*, *tali juru*, Borneo.

MALAY ARCH.: *Kunstler* 101.

SUMATRA and adjacent islands: *Anta* 438 p.p.; *Asdat* s.n.; *Docters van Leeuwen* 3234 p.p.; *Lörzing* 3699, 4073, 9098, 9627, 9756, 12990 p.p.; *Meijer* 5722, 7328.

MALAY PENINSULA and adjacent islands: *Burkill* SF 4614, SF 4615; *Burkill & Haniff* SF 13124, SF 13387; *Corner* s.n.; *Curtis* 22; *Furtado* SF 18630; *Gaudichaud* 92; *Griffith* s.n.; *Holtum & Henderson* s.n.; *Hervey* s.n.; *Hullett* s.n.; *Hume* 7739 A; *Jensen* 41; *Mohd Nur* s.n.; *Nauen* SF 35859, s.n.; *Ridley* 1479, 1719, 5809, 6112, s.n.; *Rostado* s.n.; *Seimund* 257; *Sinclair* s.n.; *Symington* FMS 26814, FMS 37924; *Wallich* 3410 p.p.; *Wilkes* B 5, 28.

W. JAVA and adjacent islands: *Backer* 26518, 33811; *Blume* s.n.; *van Borssum Waalkes* 636; *van Hasselt* s.n.; *Karta* 190; *Kern* 8423, 8664; *Kern & Meijer* 1150; *van Steenis* 11787a, 12555; *de Wit* 4210; *Zollinger* 469.

BORNEO and adjacent islands: *Aet* 183; *Clemens* 20552, 20566, 21363; *Keith* 8864; *Ramos* 1413, 1709; *van Royen* 2890.

PHILIPPINES: *Merrill* 9244; *Santos* 4740, 5991.

SE. CELEBES: *Elbert* 3078.

Note. Clarke, Fl. Br. Ind. 6, 1894, 692—694, placed this species and *Scleria ciliaris* (*S. bancana*) in the group with pseudo-whorled leaves, along with *S. purpurascens* (*S. multifoliata*) and *S. sumatrensis*, which are certainly not their closest allies. The middle leaves in *S. oblata* and *S. ciliaris* are more or less approximated, but not whorled.

9. *Scleria terrestris* (L.) Fass., *Rhodora* 26, 1924, 159, incl. *var. latior* (Clarke) Fass. et *var. decolorans* (Clarke) Fass.; S. T. Blake, Proc. R. Soc. Queensl. 62, 1952, 89; J. Arn. Arb. 35, 1954, 228. Based on *Zizania terrestris* L. — *Katu-Tsjolam* Rheede, Hort. Mal. 12, 1703, 113, t. 60. — *Zizania terrestris* Linné, Sp. Pl. 2, 1753, 991. Based on *Katu-Tsjolam* Rheede. — *Schoenus paniculatus* Burm. f., Fl. Ind. 1768, 19. [T.: Ind. Or. (G)]. — *Diaphora cochinchinensis* Lour., Fl. Cochinch. 1790, 578; ed. Willd. 1793, 709. [T.: Cochinchina (BM)]. — *Olyra orientalis* Lour., Fl. Cochinch. 1790, 552; ed. Willd. 1793, 674. [T.: Cochinchina]. — *S. scrobiculata* (non Nees) Miq., Fl. Ind. Bat. 3, 1856, 342, p.p. (specim. Jungh.). — *S. laevis* var. *scaberrima* Benth., Fl. Hongk. 1861, 400. [T.: Hongkong: *Harland*]. — *S. radula* Hance, Ann. Sc. Nat., Bot. 18, 1862, 232; Clarke, Fl. Br. Ind. 6, 1894, 691; J. Linn. Soc., Bot. 34, 1898, 101; ibid. 36, 1903, 266; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 111; Ridl., Fl. Mal. Pen. 5, 1925, 178. [T.: Honkong: *Hance* 1157 (BM)]. — *S. elata* Thwaites, En. Pl. Zeyl. 1864, 353; Boeck., Linnaea 38, 1874, 487; Clarke, Fl. Br. Ind. 6, 1894, 690, incl. *var. latior* Clarke et *var. decolorans* Clarke; J. Linn. Soc., Bot. 34, 1898, 100; ibid. 36, 1903, 264; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 114; Camus, Fl. Gén. I.-C. 7, 1912, 167; Ridl., Fl. Mal. Pen. 5, 1925, 179; H. Pfeiff., Mitt. Inst. Allg. Bot. Hamb. 7, 1928, 174. [T.: Mont. Khasia: *Scleria* 15, Hook. & Thoms. (CGE, L, NY, P, U); CP 825 (BM, K, P), 3030 (BO, CGE, K, P), 3032]. — *S. aspera* Boeck., Linnaea 38, 1874, 483, ex descr. [T.: China: *Meyen* (n.v.)]. — *S. melanostoma* Nees ex Boeck., Linnaea 38, 1874, 514; Clarke, Fl. Br. Ind. 6, 1894, 692; J. Linn. Soc., Bot. 34, 1898, 102. [T.: Pen. Ind. Or.: *Wight* 2377 (B, n.v.) = *Wight* 1002 (K)]. — *S. hirsuta* Boeck., Linnaea 38, 1874, 489, ex descr.; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 58. [T.: Java: *Junghuhn* (n.v.)]. — *S. exaltata* Boeck., Bot. Jahrb. 5, 1884, 511. [T.: Ceylon: *Thwaites* CP 3031 (BO)]. — *S. hasskarliana* Boeck., l.c. [T.: *Scleria* 15, Hook. & Thoms, p.p.]. — *S. haematostachys* Boeck., l.c. p. 512, ex descr.; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 58. [T.: Java: *Wichura* (n.v.)]. — *S. ploemii* Boeck., l.c. p. 513.

[T.: Java: *Ploem* (dupl. in L)]. — *S. kuntzei* Boeck., Cyp. Nov. 1, 1888, 34. [T.: Java: *O. Kuntze* (5033) (NY)]. — *S. rinkiana* Boeck., Cyp. Nov. 2, 1890, 30; Clarke, Fl. Br. Ind. 6, 1894, 694. [T.: Pulo Pinang: *Rink*]. — *S. chinensis* var. *biauriculata* Clarke, Fl. Br. Ind. 6, 1894, 690; J. Linn. Soc., Bot. 34, 1898, 101. [T.: Ceylon: *Thwaites* CP 825 (BM, K, P)]. — *S. multifoliata* (non Boeck.) Clarke, Philip. J. Sc. 2, 1907, Bot. 106 p.p. (*Merrill* 4834). — *S. luzonensis* Palla, Allg. Bot. Zeitschr. 13, 1907, 49; Merr., En. Philip. 1, 1923, 134. [T.: Luzon: *Merrill in Kneuck.*, Cyp. exsicc. 167 (C, K, L)]. — *S. corymbosa* (non Roxb.) Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 109, p.p.; Fl. Mal. Pen. 5, 1925, 176, p.p. — *S. chinensis* (non Kunth) Clarke, Philip. J. Sc. 2, 1907, Bot. 105, p.p. — *S. cochinchinensis* (Lour.) Druce, Rep. Bot. Exch. Club Br. Isles 4, 1917, 646; H. Pfeiff. in Fedde, Rep. 26, 1929, 263; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 57. Based on *Diaphora cochinchinensis* Lour. — *S. levis* (non Retz.) Merr., En. Philip. 1, 1923, 133, p.p. (*Merrill* 8380). — *S. hookeriana* (an Boeck.?) Kük., Bot. Jahrb. 59, 1924, 59. — *S. chinensis* var. *luzonensis* (Palla) Uitt., Rec. Trav. Bot. Néerl. 32, 1935, 201. Based on *S. luzonensis* Palla. — *S. chinensis* var. *luzonensis* f. *pilosa* Uitt., l.c. [T.: Sarawak: *Richards* 1660 (K); Uittien erroneously cited *Richards* 2016]. — *Fig. 5 a-c*.

Perennial with shortly creeping, woody rhizome. *Stems* slender to very robust, erect or scrambling over bushes and then up to a height of several meters, rigid, triquetrous, glabrous to pubescent, more or less scabrous, up to 12 mm thick in the lower part. *Leaves* subcoriaceous, rigid, linear, gradually narrowed into a very long tip, all scattered, (2—)5—20(—40) mm wide, margins and not rarely the nerves scabrous, margins recurved when dry; sheaths triquetrous, more or less widened upwards, glabrous or pubescent, scabrid, often 3-winged, the wings not rarely narrow or absent; contraligule short, rounded, with a brown, scarious margin, glabrous or ciliate. *Inflorescence* very variable in size, consisting of up to 4 distant partial panicles; partial panicles pyramidal, with ascending to rectangularly divaricate, scabrid branches; peduncles single at the nodes, compressed, usually distinctly exserted from the sheaths, scabrid; primary bracts similar to the leaves, overtopping the inflorescence, secondary ones long, setaceous, scabrid, ciliate at the base. *Spikelets* unisexual, solitary or 2—3 together; male spikelets lanceolate, 3—4 mm long; stamens 3; anthers linear, 1—2 mm long, with a short, smooth, whitish to purplish appendage of the connective; female spikelets broadly ovate, 3½—4½ mm long, the male part reduced to a sterile glume. *Disk* shortly 3-lobed; lobes appressed, short, rounded, sometimes slightly denticulate at the top, ferrugineous or yellow, purplish striolate. *Nut* ovoid or subglobose, terete to rather distinctly trigonous in the upper part, umbonulate, smooth to cancellate, often minutely hairy when young, glabrescent, shining, white or finally purplish or blackish, 2½—3 mm by 2—3 mm.

**Distribution:** In the wide circumscription given above *S. terrestris* is widely distributed, extending from Ceylon and India to China, Formosa, the Riu Kiu Islands, and Australia. Common everywhere in Malaysia.

**Ecology:** In primary and secondary forests, in open scrub, in swampy places, from sealevel up to 2200 m.

**Vernacular names:** *Ilal*, *ilat gobang*, Sund., *kerisan*, *rija-rija*, N. Sum., *patari*, Celebes, *tentaripa*, Talaud, *jebbing*, Sibil valley; Philip.: *papan*, *agagedán*, *egegedán*, Bon., *mankot*, Ig.



SUMATRA and adjacent islands: *Bartlett* 7942; *Beumée* A 458, 844; *van Borssum Waalkes* 2843; *Bünnemeijer* 75a, 2514, 8775, 8887; *van Daalen* 366; *Dames* 56; *Elbert s.n.*; *Jacobson s.n.*; *Keers* 5; *Lörzing* 4454, 4783, 4961, 6128, 6657a, 7754, 8620, 9447, 9564, 9799, 9911, 12990 p.p., 14938; *Meijer* 3499; *Rahmat si Boeoa* 4880, 6192, 10040; *Ridley s.n.*; *Roesli* 819; *Schiffner* 1652; *van Steenis* 9905; *Yates* 572.

MALAY PENINSULA and adjacent islands: *Birch s.n.*; *Burkill* HMB 810, SF 3203; *Burkill & Haniff* SF 12908; *Corner s.n.*; *Corner & Nauen* SF 37862; *Derry* 907; *Goodenough s.n.*; *Griffith s.n.*; *Henderson* 11410, SF 38266; *Holtum* SF 9576, SF 10745; *Hume* 9036, 9148, 9753a; *Kelsall* 1969; *King's coll.* 1929, 2506; *Kloss s.n.*; *Langlassé s.n.*; *Machado* 11538, 11541; *Mohd Nur* SF 11117, SF 11712, SF 32622; *Nauen* SF 38044, SF 38181; *Purseglove* P 4152, P 4154; *Ridley* 9334, 10851, 11944, 11946, 12049, 13866, 13867, 15716, 15717, 16030, 16191, s.n.; *Robinson s.n.*; *Robinson & Kloss* 6108; *Seimund* 881; *Sinclair & Kiah* SF 38727; *Sow* CF 46177; *Symington* 25880, 36107.

JAVA and adjacent islands: *Adelbert* 483; *Arsin* 19620; *Backer* 1518, 5648, 9213, 10632, 10936, 11489, 14805, 16289, 18613, 22686, 22918, 23311, 25695; *Bakhuizen van den Brink* 1001, 6143; *Blume s.n.*; *Boerlage s.n.*; *Bruggeman* 26, 331; *Danser* 5884; *Docters van Leeuwen* 12029; *Forbes* 259, 877b; *Hallier* 563, 618; *Junghuhn s.n.*; *Kern* 8245a, 8480; *Koorders* 15154, 15239, 23923, 40643, 41323, 41449, 44339; *Kuntze* 4599, 5033; *Lanjouw* 235; *Lörzing* 1639; *Main* 199; *Mohd Enoh* 157; *Nedi & Idjan* 31; *Noerkas s.n.*; *van Ooststroom* 13153, 13215, 13472, 13536, 13780, 13852; *van der Pijl* 456; *Pleyte* 179; *Raap* 612; *Ridley s.n.*; *Scheffer* 6376; *Schiffner* 1589; *Smith & Rant* 591; *van Steenis* 90, 4974, 5248, 12298; *Went & Lam* 1544; *Winckel* 1468, 1496, 1768; *Wisse* 1136; *de Wit* 4277; *Zippel* s.n.

LESSER SUNDA ISLANDS: *Backer* 12535; *Rensch* 1080.

BORNEO: *Clemens* 20212, 32579, 32599, 32795, 40032, 50038; *Endert* 4609; *Richards* 1660, 2016; *Ridley* s.n.

PHILIPPINES: *Clemens* 16583; *Edaño* PNH 12147, PNH 18062, PNH 19756, PNH 21922, BS 41776, BS 76223; *Edaño & Gutierrez* PNH 38487; *Elmer* 8401, 10326; *Merrill* in *Kneucker* 167, *Phil. Pl.* 560, 3921, 3958, 3964, 4834, 5321, 8207, 8380; *Ramos* BS 14760, BS 30194, BS 41985; *Ramos & Edaño* BS 28653, BS 28744, BS 30712, BS 39145, BS 48613; *Robinson* BS 9857; *Santos* 5809; *Vanoverbergh* 2835; *Williams* 730, 1227.

CELEBES: *Bloembergen* 3933, 4047; *Eyma* 1467 p.p., 1470, 1478, 3476, 3811; *Forsten* 156, 159; *Kjellberg* 3735. *Talaud*: *Lam* 3247.

MOLUCCAS: *Eyma* 2589; *Stresemann* 153.

NEW GUINEA: *Brass* 4779, 25685; *Docters van Leeuwen* 10459, 10555; *Eyma* 4661; *Hoogland & Pullen* 5973, 6275; *Kalkman* 4139; *Mayr* 41; *Warburg* 21031.

Notes. 1. Of the Asiatic species of *Scleria* this is the most difficult to deal with. All perennial *Scleriae* with scattered leaves, short contraligule bordered by a brown scarious band, unisexual spikelets, and a disk with short, rounded lobes are covered by the description given above. No wonder that the much varied facies of this widely distributed species has led to the distinction of numerous segregates, which according to me cannot be upheld on a specific level. They at most represent a series of races connected by numerous intermediates. I fully agree with S. T. Blake, who already in 1954 gave a long list of names in his opinion synonymous with *Scleria terrestris*.

It was especially Boeckeler who described a large number of species, most of them based on a single, often incomplete or immature, specimen. His types in the Berlin Herbarium were all destroyed, and for the species based on them one has to rely on duplicates in other herbaria or on his descriptions. When we look over an extensive material it becomes evident that Boeckeler's species cannot be upheld and even cannot be the basis of well-circumscribed subspecies.

However unsatisfactory this may seem, I have therefore refrained from splitting up the species into subspecies or varieties; this appeared to be impossible from herbarium material alone. A brief survey of those forms which are often recognized as species follows here.

2. Typical *Scleria terrestris* has distinctly winged leaf-sheaths, and cancellate white nuts, often minutely hairy when young, glabrescent at maturity. It occurs throughout the area given above, but from Farther India and the Malay Peninsula it is represented by a few collections only.

3. *Scleria radula* Hance (*S. aspera* Boeck.; Fig. 5a) is vegetatively scarcely different. It was characterized by Clarke as a robust, very slightly hairy plant with very scabrous, broad leaves, long setaceous secondary bracts, and white, smooth nuts. Additional characters are the narrowly winged leaf-sheaths and the rather distinctly trigonous upper half of the nut. *Scleria radula* extends from S. China through Indo-China and the Malay Peninsula to Sumatra, sometimes associated with the typical *S. terrestris*. Several Malaysian collections perfectly agree with the type from Hongkong. In a large number of them, however, the nuts are more or less cancellate, and in some, smooth nuts and cancellate ones occur on the same inflorescence. In other specimens referred to *S. radula* the secondary bracts are not more conspicuous than in *S. terrestris*. There is also a considerable variation regarding hairiness, scabridity, and width of the leaves, the latter sometimes being smooth, densely villous, or unusually narrow. I can see no sharp demarcation between *S. radula* and stout forms of *S. terrestris*. The latter were distinguished by Clarke as *S. elata* var. *latior*. Holttum (in sched. Sing.) reduced *S. radula* to a variety of *S. terrestris*.

The specimens cited under *S. radula* by Camus, Fl. Gén. I.-C. 7, 1912, 165, all belong to *S. tonkinensis* C. B. Clarke.

4. *Scleria haematostachys* Boeck. (Fig. 5b) is common in W. Java. It has also smooth or slightly cancellate nuts, and may be somewhat nearer to the typical *S. terrestris* than *S. radula* is. In general it has narrower, not very scabrous leaves, less conspicuous secondary bracts, and dark purplish inflorescences. Specimens with perfectly smooth nuts, but otherwise not differing from typical *S. terrestris*, occur in the Philippines (e. g. Elmer 10326).

5. Often the exposed part of the nut becomes purplish to blackish with age. *Scleria kuntzei* Boeck., *S. melanostoma* Nees ex Boeck., *S. rinkiana* Boeck., and *S. elata* var. *decolorans* C. B. Clarke, were mainly based on this phenomenon not deserving nomenclatural recognition. Boeckeler placed *Scleria kuntzei* next to *S. purpurascens* Steud. (*S. multifoliata* Boeck.), which is certainly wrong; according to me it is a more or less depauperated *S. terrestris*. *Scleria rinkiana*, mentioned in the Flora of British India as an undetermined species, was referred to the synonymy of *S. terrestris* (*S. elata* Thwaites) by Clarke in 1903. As to the type of *S. melanostoma* the following remarks of Clarke on the sheet of Wight 1002 in the Kew Herbarium may be cited:

"Boeckeler has founded his *Scleria melanostoma* on Wight n. 2377 a very young scrap in h. Berol; but the really founded it on Wight n. 1002 in herb. Berol. which is = this Kew n. 1002. The Wight n. 2377 in h. Berol. is the same, but the Wight 2377 in h. Kew greatly differs. The present plant is therefore the type verified also by Mr. N. E. Brown of *Scleria melanostoma* Boeck., which only differs from *S. elata* Thwaites in having the sheaths wingless."

Clarke 24841 and Griffith 6123, both cited under Clarke's *S. elata* var. *decolorans*, have wingless sheaths and I can in no way distinguish them from *S. melanostoma*.

6. Thus in the *Scleria terrestris*-complex also the character of the sheaths of the middle leaves being winged or wingless appears to be unfit for specific

delimitation. When wings are present their tops may be produced beyond the mouth of the sheath or fall short of it. Clarke placed *Scleria hookeriana* under the heading "sheaths winged, sometimes in *S. elata* and *S. chinensis* obscurely", at the same time admitting that in *S. hookeriana* the wings are occasionally distinct and in *S. chinensis* var. *biauriculata* sometimes obsolete! In the type collection of *S. hookeriana* the inflorescence is densely contracted, on which character Boeckeler mainly founded his species, but Clarke stated already that in well-developed specimens the panicle is much larger and more compound (see his Illustrations of Cyp., 1909, t. 128). I do not understand why Clarke thinks *S. hookeriana* is most easily known from *S. terrestris* by the panicle-branches ascending, not rectangularly divaricate. I presume that *S. hookeriana*, reported from Khasia and S. China, falls also within the variability of *S. terrestris*, but I have seen only a few specimens of it. The New Guinea specimens Kükenthal (1924) referred to *S. hookeriana* are typical *S. terrestris*.

7. The scarious brown band along the margin of the contraligule is one of the best characters to distinguish *Scleria terrestris* from its nearest allies. Clarke based his *S. chinensis* var. *biauriculata* on specimens in which this scarious appendage is broader than usual (c. 4 mm), citing "*S. elata* Thw. Enum. 353, partly, *S. exaltata* Boeck. in Engler Jahrb. V, p. 511. — Ceylon, Thwaites. Singapore, Ridley (n. 1556)."

There is considerable confusion in this part of Clarke's treatment of the genus in the Flora of British India. Ridley 1556 is cited both under *S. chinensis* and under its variety *biauriculata*; but in Journ. Linn. Soc., Bot. 34, 1898, 101 only under *S. chinensis*, so apparently excluded from the variety. However, l. c. p. 102 it is also cited as *S. bancana*! In my opinion Ridley 1556 should be referred to *S. ciliaris* Nees (= *S. chinensis* Kunth = *S. bancana* Miq.), and the natural place of Thwaites's plants is in *S. terrestris*. In *S. ciliaris* the scarious appendage of the contraligule is drawn out into a lanceolate tongue. It must, however, be admitted that *S. ciliaris* and *S. terrestris* are very close to each other, and that their delimitation almost solely rests upon the different shape of the contraligule.

Later on Clarke (1907) extended his concept of *Scleria chinensis* in applying this name to slender plants from Luzon, thus wrongly introducing it into Philippine literature. On such slender specimens Palla based his *Scleria luzonensis*, which name Uittien reduced to varietal rank (*S. chinensis* var. *luzonensis*).

8. Very stout, broad-leaved, hirsute specimens, answering Boeckeler's description of *Scleria hirsuta*, have been collected in Java (see Uittien, 1949, p. 58). I can not separate them satisfactorily from broad-leaved, more or less glabrous *S. terrestris*.

10. *Scleria ciliaris* Nees in Wight, Contr. 1834, 117; in Hook. & Arn., Bot. Beech. Voy. 1837, 229; S. T. Blake, J. Arn. Arb. 35, 1954, 227. [T.: China, Macao: Vachell (K); Millett]. — *S. chinensis* Kunth, En. 2, 1837, 357; Steud., Syn. 2, 1855, 179; Benth., Fl. Hongk. 1861, 400; Boeck., Linnaea 38, 1874, 486; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 18; Clarke, Fl. Br. Ind. 6, 1894, 690, excl. var. *biauriculata* Clarke; J. Linn. Soc., Bot. 34, 1898, 101; ibid. 36, 1903, 263; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 114; Camus, Fl. Gén. I.-C. 7, 1912, 167; Ridl., Fl. Mal. Pen. 5, 1925, 180. New name



for *S. ciliaris* Nees. — *S. bracteata* (non Cav.) Brongn. in Duperrey, Voy., Bot., 1834, 165 (Amboine: d'Urville 2, P). — *S. scrobiculata* (non Nees) Mor., Syst. Verz. 1846, 98, p.p. (quoad Zollinger 469b). — *S. bancana* Miq., Sum. 1861, 262, 602; Clarke, Fl. Br. Ind. 6, 1894, 693; J. Linn. Soc., Bot. 34, 1898, 102; Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 228; Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 112; Winkler, Bot. Jahrb. 44, 1910, 526; Valck. Sur., Nova Guinea 8, 1912, 712; Camus, Fl. Gén. I.-C. 7, 1912, 168; Stapf & Turr. in Gibbs, J. Linn. Soc., Bot. 42, 1914, 182; Merr., En. Born. 1921, 66; En. Philip. 1, 1923, 133; Ridl., Fl. Mal. Pen. 5, 1925, 178; H. Pfeiff., Mitt. Inst. Allg. Bot. Hamb. 7, 1928, 175; Kük., Bot. Jahrb. 69, 1938, 261; Ohwi, Bot. Mag. Tokyo 56, 1942, 212; Utt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 56. [T.: Banka: circa Muntok: *Kurz* (U)]. — *S. malaccensis* Boeck., Linnaea 38, 1874, 507; K. Schum., Bot. Jahrb. 13, 1891, 266; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 18. [T.: Malacca: *Gaudichaud* (FI, K, P); *Griffith* (K)]. — *S. bancana* var. *nana* Ridl., J. Str. Br. R. As. Soc. no 59, 1911, 225; Fl. Mal. Pen. 5, 1925, 178. [T.: Setul: *Ridley 14804* (K, SING)]. — *Fig. 5d.*

Perennial, with woody rhizome swollen at the nodes. *Stems* rather stout, erect, rigid, triquetrous, smooth or retrorsely scabrid on the angles, (30—) 70—100(—200) cm by up to 6 mm. *Leaves* subcoriaceous, rigid, linear, rather abruptly narrowed to the obtusish tip, all scattered or the middle ones more or less approximate and the upper ones remote, scabrous on the margins and the main nerves in the upper part, glabrous or sparsely hairy,  $\frac{3}{4}$ —1½ cm wide; sheaths triquetrous, narrowly to broadly winged, glabrous, smooth or scabrid; contraligule rounded, with a scarious, elongate, lanceolate or oblong, glabrous, purplish, 1—1½ cm long appendage, usually 2—3 times as long as wide. *Inflorescence* very variable in shape, consisting of 2—3 lateral partial panicles and a terminal one, often confluent into a pyramidal, very dense, compound panicle, or the lateral partial panicles remote to very remote, ovoid to very long and narrow, spike-like; peduncles hardly to much exserted from the sheaths; primary bracts similar to the leaves, overtopping the inflorescence, secondary ones setaceous, rigid, scabrous, ciliate at the broadened base, long-exserted from the panicles. *Spikelets* unisexual, 2—3 together, 4—5 mm long; male spikelets lanceolate; stamens 3; anthers linear, c. 2 mm long, with a subulate, scabrid, purplish appendage of the connective; female spikelets ovate, with a sterile lateral glume (the vestigial ♂ part of the spikelet). *Disk* 3-lobed; lobes appressed, triangular, obtuse, sometimes denticulate at the top, pale ferruginous. *Nut* ovoid or subglobose, obsoletely trigonous, umbonulate, slightly reticulate to undulate-rugulose, hirtellous on the transverse netted lines, finally glabrescent, shining, white or pale grey,  $2\frac{1}{3}$ — $2\frac{1}{2}$  mm diam.

*Distribution*: From Burma, Thailand, and Indo-China to S. China, the Solomon Islands, and tropical Australia; widely distributed in Malaysia, in Java only in the Western part, not known from the Lesser Sunda Islands, and in the Philippines only in Palawan and Busuanga.

*Ecology*: In primary and secondary forests, savannahs, wet places on road-sides, on beach-walls, etc., at low and medium altitudes, usually below 1000 m, in Celebes up to 1100 m (in Annam up to 1500 m).

*Vernacular names*: *Rumput sendayan bukit*, Mal., *ilat*, Sund., *rija-rija korisan*, Sum. E. C., *gegas*, Banka, *peridang*, Kutei, *wannensil*, *tabinsuroh*, *babandang*, N. Borneo.

SUMATRA and adjacent islands: *Bünnemeijer* 1353, 1652, 2347, 6217, 6275, 6397, 6433, 6461, 6549; *Dames* 12; *Koorders* 21503; *Kurz Cyp.* 4; *Meijer* 5729; *Palla s.n.*; *Rahmat si Boeea* 1989, 2118, 3091, 3844, 4177, 5523; *Rutten-Kooistra* 8; *Vorderman s.n.*

MALAY PENINSULA: *Alvins* 1225; *Burkill SF* 2835; *Burkill & Haniff SF* 15653; *Evans s.n.*; *Gaudichaud* 91 p.p.; *Griffith Kew Distr.* 6118, s.n.; *Henderson FMS* 10266, *FMS* 22969; *Holttum SF* 38289; *Hullett* 324, s.n.; *Hume* 7439; *Kloss s.n.*; *Lake & Kelsall s.n.*; *Lemann s.n.*; *Ridley* 160, 1556, s.n.; *Sinclair s.n.*; *Symington* 22992, 26971; *Vesterdal* 151.

W. JAVA: *Backer* 1994; *Bakhuizen van den Brink* 3049, 6968; *Boerlage s.n.*; *Broekhuysen* 20; *Buwalda* 2853; *Hildebrand s.n.*; *Koorders* 34552; *Ploem s.n.*; *van Steenis* 2205, 11183, 11784, 11785, 11786, 12680; *Zippel s.n.*; *Zollinger* 469b.

BORNEO: *Brooke* 8235; *Chaper s.n.*; *Clemens* 21361; *Creagh s.n.*; *Ender* 1571, 1737; *Gibbs* 2978; *Hombroen s.n.*; *Hose s.n.*; *Jaheri s.n.*; *Keith* 5976; *Meijer* 949 p.p.; *Motley* 54, 765; *Otik* 4245; *Polak* 272; *Teymann* 10933; *Hans Winkler* 50; *Yates* 65.

PHILIPPINES: *Merrill* 9202; *Ramos BS* 41175.

CELEBES: *Eyma* 1467 p.p., 3403; *Kjellberg* 542.

MOLUCCAS: *Boerlage* 35; *Labillardière s.n.*; *Robinson Pl. Rumph.* 433; *d'Urville* 2; *de Wiljes Hissink* 20.

NEW GUINEA and adjacent islands: *Anang s.n.*; *Brass* 5808, 7670, 8252, 25994; *Branderhorst* 172; *Buwalda* 5392; *Dept. Agric. Rabaul W XII*; *Gjellerup* 87b; *Himson* 27; *Kalkman* 130 (= *BW* 3494); *Kanehira & Hatusima* 12964; *Mangold BW* 2199; *Meijer Drees* 96; *NGF* 2919; *Pleyte* 1138; *Womersley NGF* 3668; *van Zanten* 1007.

Notes. 1. Readily recognizable by the long, scarious appendage of the contraligule and the long-exserted, stiff secondary bracts, which give the inflorescence a somewhat prickly appearance. Otherwise very variable in habit and size, and closely related to *S. terrestris* (L.) Fass.

2. Typical *Scleria ciliaris* has open, often large, brown inflorescences with long and narrow, often spike-like lateral panicles, whereas *S. bancana* has more compact, often very dense, oblong, greenish inflorescences, in which the short lateral panicles are not rarely confluent with the terminal one. *Scleria ciliaris sensu stricto* occurs in S. China, Indo-China, and — less pronounced — in W. Java, *S. bancana* has a much wider distribution. The two do not exclude each other geographically. *Scleria malaccensis* is the same form as *S. bancana*. The characters for discrimination are feeble and there is a continuous series between the two extremes. Clarke (1894) distinguished between *S. ciliaris* (= *S. chinensis*) and *S. bancana* mainly by the wingless or very obscurely winged leaf-sheaths of the latter, but in otherwise typical *S. bancana* broadly winged sheaths are far from being rare. I agree with S. T. Blake (1954) that the two must be united; spikelets, stamens, fruits, etc. are exactly the same in both.

11. *Scleria psilorrhiza* C. B. Clarke, Fl. Br. Ind. 6, 1894, 691; J. Linn. Soc., Bot. 34, 1898, 101; Camus, Fl. Gén. I.-C. 7, 1912, 164. [T.: "a Calcutta communicata" (K)]. — *S. alta* (non Boeck.) Camus, Fl. Gén. I.-C. 7, 1912, 166. — *S. hebecarpa* (non Nees) Merr., En. Philip. 1, 1923, 133, p.p. (quoad BS 29679) — Fig. 5e.

Perennial, with creeping stolons clothed by lanceolate, striate, purplish sheaths. Stems slender, erect, triquetrous, scabrid to almost smooth, leafy throughout, (60—)90—150 cm by 2—4 mm. Leaves chartaceous, flat, rather gradually narrowed to the slender acute tip, or (when broad) premorse (see note 2), glabrous, retrorsely scabrid on the margins, very variable in width, (6—)10—25 mm wide; sheaths loose, triquetrous, broadly winged, the wings retrorsely scabrid on the edge; contraligule short, ovate or triangular, glabrous,

with narrow, cartilaginous, incrassate, yellowish margin, which is often scabrid on the edge. *Inflorescence* dense, narrow, consisting of a terminal panicle up to 10 cm long, and often 1—2 smaller lateral ones; panicles single at the nodes, erect, oblong, narrow because of the very short branches; peduncles erect, scabrid, the lowest sometimes up to 5 cm exerted from its sheath; clusters of spikelets close together; primary bracts similar to the leaves, erect, longer than the panicles in their axils but not or hardly overtopping the inflorescence; secondary bracts subulate, standing out from the panicle, often curved. *Spikelets* female (or bisexual) and male, 2—3 together, reddish brown; male spikelets shortly peduncled, lanceolate, 4—5 mm long; stamens 3; anthers linear,  $1\frac{1}{2}$ —2 mm long; appendage of the connective conical-subulate, smooth, c.  $\frac{1}{2}$  mm long; nut-bearing spikelets broadly ovoid, c. 5 mm long, with a sterile or male flower besides the female one. *Disk* triangular, reflexed, shallowly or hardly 3-lobed, lobes very obtuse. *Nut* large, ovoid or broadly ovoid, not or slightly overtopping the glumes, very obtusely trigonous, obtuse, not beaked, smooth, very shining, white,  $3-3\frac{2}{3}$  by c. 3 mm.

*Distribution*: Very local and scattered, from India through Thailand, Cambodia, and Malaysia to N. Australia (near Darwin: *Allen 19*, K).

W. JAVA. Cheribon, forestry Indramaju, 20—30 m, along a ditch: *van Steenis 6671a* (BO, L).

PHILIPPINES. Luzon, prov. of Laguna, College Campus, along creek, 50 m: *Juliano s.n.* (MTJB); prov. of Rizal, Mt Lumutan: *Ramos & Edaño BS 29679* (K, NY, P).

*Notes*. 1. Close to *S. junghuhnii*, but readily recognizable by the presence of stolons, the stems not spongy at the base, the broadly winged sheaths, the narrow, spike-like, dense panicles, the long, setaceous ultimate bracts, the disk not surrounded by an elevation of the pericarp, the non-tubercled scar of the cupula, and the obtuse nut not, or hardly, overtopping the glumes.

2. This is the only Asian species sometimes clearly showing the curious character of 'premorse' leaves. In such leaves (occurring in several African and American species) the lower part is broadened by a continuation of the wings of the leaf-sheath and shows 5 principal nerves. Towards the apex there is a sudden narrowing (usually at not quite opposite points of the margin). The distal part of the leaf is therefore much narrower than the proximal part, and has only 3 principal nerves. On the morphology and anatomy of this interesting type of leaves see Chermezon, *Rev. Gén. de Bot.* 38, 1926, 337—353.

3. Both in the Javan collection and the Philippine ones the disk is hardly lobed and very narrow, distinctly narrower than in the specimens from the Asiatic continent (see figs.), but otherwise they agree very well with the latter ones.

**12. *Scleria junghuhniana*** Boeck., *Linnaea* 38, 1874, 499. [T.: Central Java: *Junghuhn* (n.v.)]. — *Fig. 5 f.*

Perennial with short woody rhizome and thick, dark red roots. *Stems* stout, erect, triquetrous, spongy towards the thickened base, leafy throughout, scabrid on the angles, up to 100 cm by 7 mm. *Leaves* herbaceous, flat, broadly linear, rather abruptly narrowed to the obtusish tip, glabrous, retrorsely scabrid on the margins, 7—13 mm wide; sheaths loose, triquetrous, not winged, scaberulous on the angles; contraligule short, broadly ovate, rounded, glabrous, with scarious, whitish margin. *Inflorescence* very loose, consisting of a terminal panicle and 2—3 distant lateral ones; panicles single at the nodes, compound, ovoid, c. 10



by 5—8 cm, branches obliquely patent, scabrid, spike-like, or with a few secondary branches 1—3 cm long; peduncles erect, long-exserted from the sheaths, compressed, scabrid; clusters of spikelets distant (1—2 cm spaced); primary bracts similar to the leaves, much longer than the panicles in their axils, but not overtopping the inflorescence; ultimate bracts very short, scale-like, shorter than to as long as the clusters of spikelets in their axils. *Spikelets* bisexual and male, 2—3 together, reddish brown; male spikelets lanceolate, 3 mm long, peduncled (peduncles c. 3 mm); stamens 3; anthers oblong-linear, c. 1 mm long; appendage of the connective conical-subulate, c.  $\frac{1}{3}$  mm long, somewhat bristly at the top; nut-bearing spikelets broadly ovoid, 4 mm long, with 1—2 male flowers besides the female one; largest glume c. 3 mm long. *Disk* thick, triangular, narrow, reflexed, not lobed, brown, each side bordered by a low swelling of the pericarp; scar of the cupula with 3 depressed-conical tubercles. *Nut* large, much exserted from the glumes, ovoid, terete or obsoletely trigonous, acutish, not beaked, smooth, very shining, white, sometimes slightly discoloured,  $3\frac{1}{3}$ — $3\frac{1}{2}$  by  $2\frac{2}{3}$  mm.

W. JAVA. Cheribon. Forestry Indramaju, along ditch; a tall, robust species, very striking in the field, in the distance reminding one of *Coix* in fruit: *van Steenis* 6722 (BO, L).

Notes. 1. The distribution of this remarkable species is almost unknown. It has also been collected in Cambodia (forest of Pnom-penh: *d'Alleizette* s.n., L), and Cochinchina (Prov. Bienhoa, marsh with wild rice, black basaltic soil: *Poilaue* 21326, MTJB).

2. Boeckeler's type is from Central Java, res. Kedu, "in humidis planitiie prope Awu-Awu." It got lost during the war. The *Scleria* specimen in the Leyden Herbarium thus labelled belongs to *S. terrestris* (L.) Fass.; it was cited by Miquel, Fl. Ind. Bat. 3, 1856, 342 under *S. scrobiculata*, and does not at all agree with Boeckeler's accurate description of *S. junghuhniana*, which undoubtedly refers to the species described above.

13. *Scleria poaeformis* Retz., Obs. 4, 1786, 13; Willd., Sp. Pl. 4, 1805, 316; Nees in Wight, Contr. 1834, 118; Kunth, En. 2, 1837, 358; Steud., Syn. 2, 1855, 179; Fischer, Kew Bull. 1931, 265; S. T. Blake, Proc. R. Soc. Queensl. 62, 1952, 89; J. Arn. Arb. 35, 1954, 231; Nelves, Kew Bull. 1956, 110. [T.: India Or.: *Koenig* (LD; in L probably a duplicate)]. — *S. oryzoides* Presl, Rel. Haenk. 1, 1828, 201; Nees in Wight, Contr. 1834, 116; Kunth, En. 2, 1837, 356; Steud., Syn. 2, 1855, 169; Miq., Fl. Ind. Bat. 3, 1856, 342; Thwaites, En. Pl. Zeyl. 1864, 353; Boeck., Linnaea 38, 1874, 492 ('*orizoides*'); Benth., Fl. Austr. 7, 1878, 432; F.-Vill., Nov. App. 1882, 310; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 18; Clarke, Fl. Br. Ind. 6, 1894, 691; J. Linn. Soc., Bot. 34, 1898, 101; Philip. J. Sc. 2, 1907, Bot. 105; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 110; J. Str. Br. R. As. Soc. no 59, 1911, 225; Camus, Fl. Gén. I.-C. 7, 1912, 164; Merr., En. Born. 1921, 67; En. Philip. 1, 1923, 134; Ridl., Fl. Mal. Pen. 5, 1925, 177; Van Steenis, Bull. Jard. Bot. Btzg III, 17, 1948, 399; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 57. [T.: Luzon: *Haenke* (dupl. in K)]. — *Fig. 5 g.*

Stout, glabrous perennial with thick, horizontally creeping rhizome. *Stems* rather distant, robust, erect, triquetrous with more or less concave sides, smooth or scabrid on the angles at the top, often rooting from the lower nodes, 1—2 m

by up to 1 cm (at the base sometimes up to 2 cm thick). *Leaves* mainly basal and subbasal (1—3 higher on the stem), coriaceous, flat or canaliculate, exactly linear, rather abruptly narrowed at the obtusish, somewhat cucullate tip, septate-nodulose, smooth, or scabrid on the margins and the 3 prominent nerves, up to 25 mm wide, the upper ones shorter and narrower; upper sheaths acutely triquetrous or narrowly winged, smooth or scabrid on the angles, mouth concave or truncate on the ventral side, with narrow scarious margin; lower sheaths spongy, purplish red. *Inflorescence* as a rule a single terminal, compound, rather dense, long-peduncled panicle with a small setaceous bract at the base, or ebracteate, ovate or elliptic in outline, 10—20 by 5—10 cm, very rarely a lateral panicle in the axil of a leafy bract added; ultimate branches obliquely erect, spiciform, with scabrid axis. *Spikelets* solitary, sessile, evenly distributed along the spiciform branches, usually unisexual; male spikelets numerous, 4—5 mm long; stamens 3, anthers linear, c.  $1\frac{1}{2}$  mm long, with a distinct, conical-subulate, purplish appendage of the connective; nut-bearing spikelets few, mostly restricted to the base of the branches, 4—5 mm long, their male part reduced to a sterile glume or to 1—2 flowers (often with 2 stamens); glumes ovate, acute, muticous. *Disk* small, much narrower than the base of the nut, thick, triangular-cordate (emarginate on one side only), appressed to the nut. *Nut* about as long as the glumes, obtusely trigonous to almost terete, ovoid, ellipsoid, or subglobose, not or scarcely apiculate, with 3 depressions at the base, smooth and glabrous, very shining, white,  $2\frac{1}{3}$ —3 by  $2\frac{1}{2}$ —3 mm.

*Distribution*: Africa (Zanzibar, Mozambique); from Ceylon and SE. India through Thailand and Indo-China to Hainan, and through Malaysia to tropical Australia (N. Territory and N. Queensland); widely spread in Malaysia, but very local: Sumatra (Atjeh, Palembang), Malay Peninsula (Perlis, Kedah, Perak, Trengganu, Malacca, Johore, Singapore), W. Java, Borneo, Philippines (Luzon, Palawan), SE. Celebes, New Guinea (Papua), Aru Islands. The specimens labelled "Sumbawa, leg. *Ploem*" (L) have certainly been mislabelled.

*Ecology*: In fresh-water swamps, swampy savannah-forests, fallow rice-fields, along ditches, at low altitudes, in Atjeh up to c. 1000 m. Often forming dense, pure stands.

*Use*: In W. Java the leaves are sometimes used for making mats.

*Vernacular names*: N. Sumatra: *benjén*; Mal. Pen.: *rumput siku dana*, *purun tikus*, *perau*; W. Java: *wlingi* (Sund.); Borneo: *kara* (Dusun), *bundung* (Bajau); Philippines: *agáas* (Bik.).

**SUMATRA.** *Atjeh*. Gajolands, Sangir valley, above Blang Kedjeren: *van Steenis* 9835 (BO, K, L); Gajo and Alas Lands: *Pringo Atmodjo* 234, 274 (L). *Palembang*. Pladju: *Rutten-Kooistra* 14 (BO, L).

**MALAY PENINSULA.** *Kedah*: *Vesterdal* 461 (C); Alor Sta: *Ridley* 14803 (K, SING); near Godiang: *Symington* 57047 (KEP). *Perak*. Trang: *Kunstler* 1413 (L). *Trengganu*. Besut: *Sinclair & Kiah* SF 40784 (SING). *Malacca*: *Alvins* 25 (SING); *Gaudichaud* 90 (P); *Griffith, Kew Distr.* 6130 (K), *s.n.* (CGE); Batu Berendam: *Burkill* 1363 (SING); *Sinclair* SF 40545 (BM, K, L, SING); Fish Culture Research Station: *Mohd Shah* 40 (K, L, SING). *Johore*. Sungei Rhu Reba, Jason Bay: *Corner* SF 28507 (BO, K, SING); Serom: *Ridley* 10998 (K, SING). *Singapore*: *Hullett s.n.* (K); *Ridley* 5808 (BM, SING).

**W. JAVA.** Pen-gallan: *Horsfield* 628 (BM); near Batavia: *Kuhl & van Hasselt s.n.* (L); Tjilintjing: *Olivier* 3 (BO); between Krandji and Bekasi, Rawah Tembaga: *van der Meer & den Hoed* 1468 A (L); *van Steenis* 1244 (K, L, SING), 12544 (BO, SING).

**BORNEO:** *Korthals s.n.* (L). North Borneo. Jesselton: *Clemens* 9691 (BO, K),

*Topping* 1920 (NY); Lota Belud: *Keith* 6785 (K, SING). Southeast Borneo. Banjarmasin: *Motley* 1296 (CGE); Bati-Bati: *Miki* 11 (BO).

PHILIPPINES. Luzon: *Haenke s.n.* (K); Isabela: *Merrill* 144 (BO, K). Palawan: *Merrill Phil. Pl.* 1294 (BM, BO, L, NY, P, SING).

SE. CELEBES. Rumbia, Wambakowu: *Elbert* 3095 (L); Lasao: *Kjellberg* 1181 (BO).

NEW GUINEA. Papua. W. Div., Wuroi, Oriomo R.: *Brass* 5748 (BO, L, NY); Daru Island: *Brass* 6338 (BM, BO, K, U); Lake Daviumbu, Middle Fly R.: *Brass* 7855 (BM, BO, U); Gaima, Lower Fly R.: *Brass* 8261 (BM, BO, U). Aru Islands. P. Trangan: *Buwalda* 5498 (BO, K, L, SING).

#### THE SPECIES WITH 'WHORLED' LEAVES (Nos 14—17)

The group of *Sclerias* in which the normally developed internodes of the flowering stems alternate with some much shortened ones, and in which consequently the middle leaves are spuriously opposite or whorled is easily recognizable, but extremely difficult to split up.

The best characterized species of the group is certainly *S. sumatrensis*, which is already perfectly distinct by the peculiar shape of the tall disk. Though the characters of the Western *S. purpurascens* and the Eastern *S. polycarpa* are less pronounced, these species can satisfactorily be distinguished. After these three have been segregated, there still remains a large number of specimens which I am unable to arrange in natural groups. In the present paper they are united under the binomial *Scleria scrobiculata* Nees. For the majority of these specimens the large, ovoid, scrobiculate, white nut is characteristic, but in a few collections the ripe nuts are perfectly smooth. This is for instance the case in *Hoogland* 3363 (Fig. 6 c) and *Schram BW* 7738, from Papua and W. New Guinea respectively, also remarkable by their 2 cm broad leaves, with 1 cm broad, reddish wings of the sheaths. They probably represent a special race.

A narrow-leaved, very slender form, with obsolete scrobiculate nuts and broad lobes of the hypogynous disk is represented by *Brass* 6244 from Daru Island, and *Koch, herb. Lugd. Bat.* 909.89-44 from W. New Guinea.

Most remarkable is *Brass* 27949 from Sudest Island (Fig. 6 d). It may not belong to *S. scrobiculata*. The nuts are ellipsoid, 3—3  $\frac{1}{2}$  mm long and 2  $\frac{1}{3}$  mm wide, slightly rugulose, vividly violet, and the lobes of the yellow disk lanceolate, much narrower and longer than in typical *S. scrobiculata*.

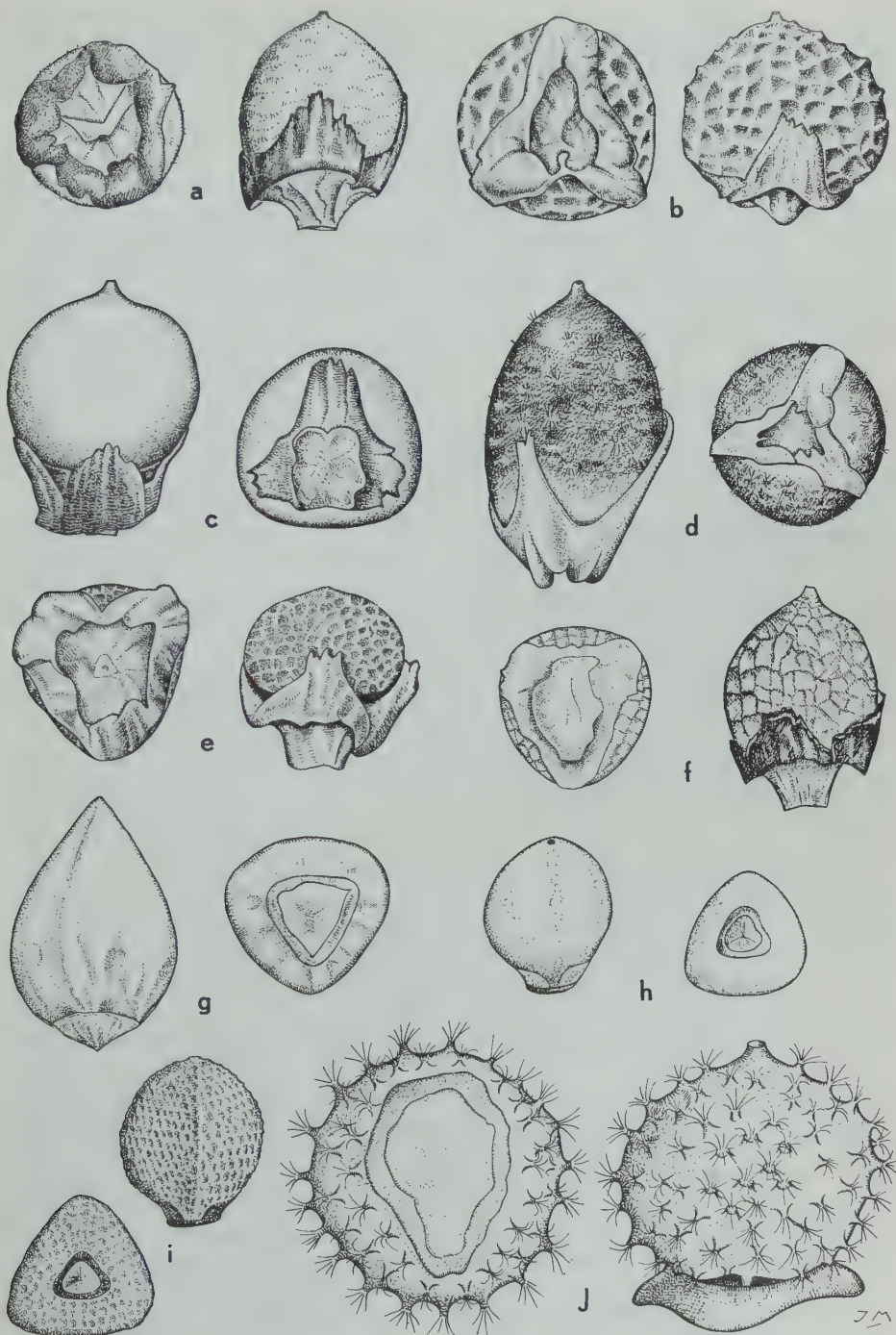
Apparently the variability is much greater in New Guinea than elsewhere in the Malaysian area. Unfortunately all the aberrant forms mentioned are represented in the herbaria by one or two collections only, so that it would be premature to describe them as special races. A subspecies with small, much depressed nuts has been collected several times and is described below.

Both in *S. purpurascens* and *S. polycarpa* the leaf-sheaths are wingless. In *S. scrobiculata* they may be wingless or narrowly to broadly winged. The species was based on two collections, from Manila, leg. *Meyen* and from Rawak, leg. *Gaudichaud*. I have not seen the former collection; in the latter the

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Fig. 6. Nuts and disks of: a. *Scleria polycarpa* Boeck.; b. *S. scrobiculata* Nees; c. *ditto* (*Hoogland* 3363); d. *S. cf. scrobiculata* Nees (*Brass* 27949); e. *S. scrobiculata* Nees ssp. *discocarpha* Kern; f. *S. purpurascens* Steud.; g. *S. corymbosa* Roxb.; h. *S. lithosperma* (L.) Sw. var. *lithosperma*; i. *S. lithosperma* (L.) Sw. var. *linearis* Benth.; j. *S. carphiformis* Ridl. — a—i  $\times 10$ ; j  $\times 20$ .





sheaths are distinctly winged, in spite of the fact that no wings are mentioned in the original description. In a subsequent publication Nees (1843) also refers his *S. timorensis* to *S. scrobiculata*. In all the specimens of Leschenault's collection from Timor, on which *S. timorensis* was based, the sheaths are wingless.

*Scleria purpureovaginata* Boeck., Bot. Jahrb. 5, 1884, 513, was treated by Clarke (1907, p. 105) as a separate species, related to the other species with falsely opposite or whorled leaves, but distinguished by the strongly 3-winged leaf-sheaths. Clarke cites several Philippine collections, among them *Wichura 1852 bis*. This cannot be Boeckeler's type-collection, as *Scleria purpureovaginata* was described as having narrow, wingless sheaths. In my opinion it is even doubtful whether the name belongs in the synonymy of *S. scrobiculata*, to which it was referred by S. T. Blake (1954). In Boeckeler's description no mention is made of whorled leaves, and the species is said to be near to *S. elata* Thwaites.

14. *Scleria sumatrensis* Retz., Obs. 5, 1789, 19, t. 2; Willd., Sp. Pl. 4, 1805, 315; Nees in Wight, Contr. 1834, 116; Kunth, En. 2, 1837, 357; Steud., Syn. 2, 1855, 171; Miq., Sum. 1861, 262, 602; Thwaites, En. Pl. Zeyl. 1864, 353; Boeck., Linnaea 38, 1874, 513; Rolfe, J. Bot. 1885, 216; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 18; Clarke, Fl. Br. Ind. 6, 1894, 693; J. Linn. Soc., Bot. 34, 1898, 103; Usteri, Beitr. Kenntn. Philip. Veg. 1905, 132; Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 228; Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 113; Clarke, Philip. J. Sc. 2, 1907, Bot. 106; Ill. Cyp. 1909, t. 129 f. 1—2; Camus, Fl. Gén. I.-C. 7, 1912, 170, f. 21, 9; Merr., En. Born. 1921, 67; En. Philip. 1, 1923, 135; Ridl., Fl. Mal. Pen. 5, 1925, 179; H. Pfeiff., Mitt. Inst. Allg. Bot. Hamb. 7, 1928, 174, f. 6; Ohwi, Mem. Coll. Sc. Kyoto Imp. Un. B 18, 1944, 5; Utt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 54; S. T. Blake, Proc. R. Soc. Queensl. 62, 1952, 88. [T.: Sumatra: *Wennerberg*]. — Fig. 5 h.

Perennial, with thick, woody, nodose rhizome. *Stems* robust, erect or scrambling over bushes, triquetrous, glabrous, smooth or slightly scabrid, up to 4 m tall by up to 8 mm thick. *Leaves* in the middle part of the stems (and lower bracts) clustered in pseudo-whorls of 3—5, rigid, patent, gradually narrowed upwards, scabrous on the margins and the main nerves in the upper part, glabrous or puberulous at the base, with revolute margins, up to 13 mm wide, lower ones very short; sheaths narrow, glabrous or puberulous, triquetrous, wingless to rather broadly winged, brown at the base; contraligule very short, broadly rounded, ciliate. *Inflorescence* oblong, erect, decompound, usually very dense, rarely rather loose, the terminal panicle up to 25 cm long, the lateral ones 2—3 together, on long, erect peduncles, pyramidal; branches stiff, patent, winged-angular, rhachis smooth or scabrid; primary bracts foliaceous, shorter than to about as long as the inflorescence, secondary ones setaceous. *Spikelets* in clusters of 2—3, unisexual, light or reddish brown, 4—5 mm long; male spikelets peduncled, lanceolate; stamens 3; anthers linear, c. 2 mm long, with long, conical, somewhat bristly appendage of the connective; female spikelets ovate, rounded at the base, the male part reduced to a sterile glume; glumes ovate or broadly ovate, very acute, stramineous to purplish, with green keel. Cupula large and thick, c. 2 mm broad. *Disk* very large, cyathiform, coriaceous,  $\frac{1}{2}$ — $\frac{3}{4}$  as high as the nut (sometimes almost completely enveloping it),  $1\frac{1}{2}$ —2 mm high, strongly longitudinally plicate, halfway or less 3-lobed, at first yellowish, finally red; lobes broadened upwards, very obtuse, denticulate-

crenulate, their margins contiguous or somewhat overlapping. *Nut* slightly shorter than the glumes, depressed-globose, terete, umbonulate, sparsely pilose, glabrescent, cancellate, shining, olivaceous-brown to greyish black, c. 2 mm diam.

**Distribution:** Widely spread from Ceylon and India to Formosa, Indo-China, and Queensland; in Malaysia: Sumatra and adjacent islands, Malay Peninsula, W. Java, E. Java (Djatirot, Puger), Borneo, Celebes (Kolonedale), Philippines (Palawan, Mindanao, Basilan, Leyte).

**Ecology:** In dry, open places, thickets and forests, but also in swamps and swampy forests, at low altitudes (up to 500 m); often dominant.

**Vernacular names:** *Rija-rija*, *si anit*, Sum.; *rumput kumba*, *r. siamet*, *sendayan*, *rumput sesayah gajah*, Mal. Pen.; *tali juru*, *rambang*, *kares-kares*, *keris-keris*, *kerisan*, *sampa hiering*, *perèdang*, Borneo; Philip.: *balbalili*, Bon., *buldo*, Sub., *pangpayung*, C. Bis.

**SUMATRA** and adjacent islands: Asdat 9; Bartlett 6426, 7249; Bruinier 62; Bünnemeijer 6142, 7276, 7450, 7503, 7614, 7883; Hagerup s.n.; Iboet 52; Koorders 21535; Kurz s.n.; Lörzing 3357; Lütjeharms 5230; Meijer 5238, 5732, 6686; Polak 151; Praetorius s.n.; Rahmat si Boeea 4282, 5071, 8268; Rappard 88; Riedel s.n.; Ruttner 148.

**MALAY PENINSULA:** Alvins 1638; Burkill & Haniff SF 13152; Cantley's coll. 2607, 3120; Griffith Kew Distr. 6133; Henderson SF 10298, SF 10348; Holtum 9228, SF 19899, SF 24661, SF 38290; Hullett s.n.; Hume 8233; King's coll. 2045; Lemann s.n.; Mohd Nur SF 34071; Mohd Shah 136; Nauen SF 38011, SF 38177; Ridley 25, s.n.; Rostado s.n.; Sinclair s.n.; Spare SF 36002; Symington 20530; G. Thomson s.n.; Wallich 3407 p.p.; Wilkes s.n.

**JAVA:** Horsfield s.n.; Zippel s.n. West: Backer 30812; Endert E 1188; Kern & Meijer 1149; Polak s.n.; van Slooten 578; van Steenis 3091. East: Backer 7894; Koorders 20972, 21221.

**BORNEO:** Amdjah 838; Anthony A 730; Baker s.n.; Beccari PB 51; Bianchi 53; Brooke 10630; Buwalda 7711, 7884; Clemens 21362, 21364, 21365 p.p., 21854; Creagh s.n.; Elmer 20721; Endert 1458; Franck 263, 994; Kadir 938, A 2010, A 2098, A 2649, A 2717, A 3563; Keith 8863; Kondo & Edaño PNH 38731; Meijer 949 p.p., 2307a; Mohd Dachlan 11; Mohd Enoh 268; Native coll. 1287, 1664; Polak 193, 428, 467a; Purselove & Shah P 4595; Symington 48500; Teysmann 10936, 10942, 10950.

**PHILIPPINES:** Clemens 1116; de Vore & Hoover 7; Frohne PNH 35703; Merrill 9750; Reillo BS 16349; Santos 5043.

**CELEBES:** Eyma 3998.

**15. *Scleria polycarpa*** Boeck., *Linnaea* 38, 1874, 509; S. T. Blake, J. Arn. Arb. 35, 1954, 230. [T.: Ins. Fichi, ex herb. Hooker (dupl. in K)]. — *S. margaritifera* Willd., Sp. Pl. 4, 1805, 312; Boeck., *Linnaea* 38, 1874, 511; Benth., Fl. Austr. 7, 1878, 430; Rendle in Gibbs, Arfak 1917, 200, non Gaertn. (1788). [T.: in insula Tanna, Forster]. — *S. graeffeana* Boeck., *Flora* 58, 1875, 121; Benth., Fl. Austr. 7, 1878, 431, p.p.; K. Schum., Bot. Jahrb. 13, 1891, 266; Valck. Sur., Nova Guinea 8, 1912, 712; Palla in Rech., Denkschr. K. Ak. Wiss. M.-N. Kl. Wien 89, 1913, 500. [T.: Nova Holland., Port Mackay: Am. Dietrich 643 (BM, HBG); Samoa-insulae: Graeffe (dupl. in K)]. — *S. levis* f. *villosa* Valck. Sur., Nova Guinea 8, 1912, 712; Kük., Bot. Jahrb. 59, 1924, 58; ?Ohwi, Bot. Mag. Tokyo 56, 1942, 212. [T.: Ins. Neu-Pommern: Peekel 29, 30 (BO)]. — *S. ternifolia* Domin, Bibl. Bot., Heft 85, 1915, 490, ex descr. [T.: NE. Queensland, Harveys Creek: Domin (n.v.)]. — *S. scrobiculata* (non Nees) Schum. & Laut., Fl. Schutzgeb. 1900, 198, p.p.; Kük., Bot. Jahrb. 59, 1924, 58, p.p.; Ohwi, Bot. Mag. Tokyo 56, 1942, 212. — Fig. 6a.

Perennial with thick, shortly creeping, woody rhizome. *Stems* erect, rigid, triquetrous, scabrid on the angles, glabrous or short-pubescent, often with



asperous sides, many-leaved, up to 120 cm by 3—6 mm. *Leaves* in the middle part of the stem clustered, in pseudo-whorls of 2—5, rigid, coriaceous, patent, gradually narrowed upwards, flat or with recurved margins, acute, scabrid on the margins, more or less asperous above, glabrous or pubescent beneath, 5—10 mm wide; sheaths glabrous or pubescent, triquetrous, not winged; contraligule short, broadly rounded, hirsute-ciliate. *Inflorescence* narrow, dense or rather dense, 20—50 cm long, consisting of a terminal panicle and up to 7 lateral ones; rhachis scabrid or smooth; panicles erect, oblong, single or binate at the nodes, 7—10 cm long, with obliquely erect, almost spiciform, short branches; primary bracts leafy, secondary ones inconspicuous, setaceous, ciliate at the dilated base, shorter than the branchlets in their axils. *Spikelets* 2—3 together, unisexual; male spikelets narrowly lanceolate, c. 3 mm long; female spikelets evenly distributed along the branchlets and throughout the panicles, numerous, sub-orbicular, rounded at the base, c. 4 mm long; stamens 3; anthers linear, c. 1 mm long, with long, conical purplish appendage of the connective. *Disk* large, coriaceous, less deeply 3-lobed than in *S. scrobiculata* and *S. purpurascens*, shining, bright yellow or reddish; lobes broadly triangular, very obtuse, prominently denticulate, appressed. *Nut* exserted from the glumes, globose, hardly or not umbonulate, almost smooth to slightly rugulose, hirtellous, white or (frequently) more or less tinged with blue, with purplish style-scar, 2—2½ mm long and wide.

**Distribution:** From tropical Australia (N. Territory, Queensland) through Melanesia to Fiji, Samoa, and Tonga Islands; in Malaysia: Moluccas (Halmaheira, Ceram), New Guinea, and adjacent islands.

**Ecology:** In rain-forests, swamp-forests, forest-borders, on banks of streams, also in coast-vegetation, at low altitudes, rarely up to 1200 m.

**Vernacular names:** *Sáta*, Ceram; *simbora*, Orokawa lang., Mumuni.

MOLUCCAS. Halmaheira: *Anang* 457 (BO, L). Ceram: *Buwalda* 5987 (BO, K, L); *Kornassi* 445 (BO, K, L, U).

NEW GUINEA. W. New Guinea. Sorong: *Djamhari* 350 (BO, L), 575 (BO, K, L, SING); *Hellendoorn* 65 (L); *van Royen* 3196 (L); Manokuari: *Gibbs* 6166 (BM); *Janowsky* 500 (BO, K, L, SING); island of Roon: *Gibbs* 6239 (BM, K); Waren, 60 miles S of Manokuari: *Kanehira & Hatusima* 13129 (BO); Beriat, 12 km S of Teminabuan: *Kalkman BW* 6285 (L); Tarera nr Uta: *Aet* 574 (BO, K, L, SING); bank of Oten River: *Lam* 479 (BO, K, L); Van Gelder River: *Docters van Leeuwen* 9318 (BO, L). Territory of New Guinea. Sepik Distr., Angoram: *Womersley NGF* 3660 (L); Lae: *Henty NGF* 11577 (L); Augusta R.: *Hollrung* 875 (P); *Schlechter* 18406 (L, P). Papua. N. Div., between Ambasi and Devatutu villages: *Hoogland* 3408 (K, L); W. Div., Lower Fly R.: *Brass* 8115 (U); Centr. Div., Kubuna: *Brass* 5563 (L); E. Div., Fife Bay: *Turner* 95 (BM); Huon Golf: *Lauterbach* 1185 (BO, L, SING); Cape Vogel: *Saunders* 109 (BM, L); *Hoogland* 4747 (BM, BO, K, L). New Britain: *Floyd* 3477 (K, L); *Peekel* 29, 30 (BO). Misima Isl.: *Brass* 27650 (BO, K, L). Rossel Isl.: *Brass* 28306 (K, L). Sudest Isl.: *Brass* 27734 (K, L). Jappen-Biak. Wandesi nr Serui: *Aet & Idjan* 604 (BO, L). Lawak (= Rawak): *Gaudichaud s.n.* (P). Misool. Solal: *Pleyte* 1139 (BO, L, SING).

16. *Scleria scrobiculata* Nees & Mey. ex Nees in Wight, Contr. 1834, 117; Kunth, En. 2, 1837, 342; Nees, Nov. Act. Ac. Caes. Leop.-Car. 19, Suppl. 1, 1843, 119; Mor., Syst. Verz. 1846, 98, p.p. (quoad *Zollinger* 470); Steud., Syn. 2, 1855, 169; Miq., Fl. Ind. Bat. 3, 1856, 342, p.p. (excl. specim. Junghuhn.); Boeck., Linnaea 38, 1874, 508; F.-Vill., Nov. App. 1882, 310; K. Sch. & Laut., Fl. Schutzgeb. 1900, 198, saltem p.p.; Clarke, J. Linn. Soc., Bot. 36, 1903, 266;

Philip. J. Sc. 2, 1907, Bot. 106; Valck. Sur., Nova Guinea 8, 1912, 712; Merr., Sp. Blanc. 1918, 83; En. Philip. 1, 1923, 135; Kük., Bot. Jahrb. 59, 1924, 58, p.p.; Elm., Leaf. Philip. Bot. 10, 1938, 3546; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 55; S. T. Blake, J. Arn. Arb. 35, 1954, 229. [T.: Manila: *Meyen*; Rawak: *Gaudichaud* (FI, P)]. — *S. trialata* (non Poir.) Brongn. in Duperrey, Voy., Bot., 1834, 165 (Amboine et Rawak: *d'Urville & Gaudichaud*, P). — *S. tessellata* (non Willd.) Decne, Nouv. Ann. Mus. Hist. Nat. 3, 1834, 362; Herb. Tim. Descr. 1835, 34. — *S. timorensis* Nees, Linnaea 9, 1835, 303, nom. nud. [T.: Timor: *Leschenault* (C, CGE, K, L, NY, P)]. — *S. foveolata* (non Cav.) Llanos, Frag. Pl. Filip. 1851, 103; F.-Vill. & Naves in Blanco, Fl. Filip. ed. 3, 4<sup>1</sup>, 1880, 79. — *S. keyensis* K. Schum. in Warb., Bot. Jahrb. 13, 1890, 267, ex descr.; Valck. Sur., Nova Guinea 8, 1912, 713. [T.: Key Isl.: *Warburg* (n.v.)]. — *S. purpureovaginata* (an Boeck.?) Clarke, Philip. J. Sc. 2, 1907, Bot. 105; Merr., En. Born. 1921, 67. — *S. multifoliata* (non Boeck.) Clarke, Philip. J. Sc. 2, 1907, 106, p.p. (quoad *Topping* 460). — *S. elata* (non Thwaites) Lam, Nat. Tijd. N.I. 88, 1928, 194.

**ssp. scrobiculata** — *Fig. 6 b*.

Perennial with thick, shortly creeping, woody rhizome. *Stems* usually robust, erect, triquetrous, glabrous, scabrid on the angles, many-leaved, up to 2½ m tall and 4–10 mm thick. *Leaves* in the middle part of the stems clustered, in pseudo-whorls of 2–5, rigid, patent, gradually narrowed upwards, scabrid on the margins and the main nerves, glabrous, 4–20 mm wide; sheaths glabrous, triquetrous, wingless or winged (wings up to 1 cm wide, often protracted at the top into an up to 1 cm long auricle), green or purplish; contraligule short, broadly rounded, hirsute-ciliate. *Inflorescence* broad, up to 70 cm long, rather loose to dense, consisting of a large, broadly pyramidal terminal panicle and up to 7, single or binate lateral ones on erect, sometimes very long peduncles; branches patent, rhachis scabrid; ultimate bracts conspicuous, stiff, ciliate at the dilated base, more or less exserted from the panicle. *Spikelets* 2–3 together, unisexual; male spikelets peduncled, lanceolate, 3–4 mm long; female ones at the base of the branchlets, ovoid, rounded at the base, 4 mm long; stamens 3; anthers 1–1½ mm long, with long-conical, somewhat bristly appendage of the connective. *Disk* 3-lobed, triangular, thick, glabrous, yellowish; lobes triangular, obtuse, c. ⅓ as high as the nut, 1–1¼ mm long, denticulate at the top. *Nut* rather large, exserted from the glumes, ovoid or broadly ovoid, umbonate, scrobiculate, rarely smooth, hirtellous on the raised walls, glabrescent, white, 2½–3 by 2½–2⅔ mm.

**Distribution:** Thailand, Indo-China, Andamans, through Malaysia to Palau Islands and Samoa; in Malaysia: once collected in the Malay Peninsula (Johore); very rare in Sumatra, Java, and Borneo; common in the Philippines and the Lesser Sunda Islands, and probably not rare in Celebes, the Moluccas, and New Guinea.

**Ecology:** In damp shaded localities: thickets, forests, forest-borders, old clearings, etc., usually at low altitudes, rarely up to 1250 (1800?) m.

**Vernacular names:** *Ilat*, Sund., *badingan*, *kerissan*, Jav., *kupukuë*, Flores, *tentaripa*, Talaud, *eri*, Halmaheira, *riap*, *intarip*, *rumpūt piso*. Minahassa; Philippines: *agagidán*, Bon., *aladán*, *amamgid*, *tangra*, Ilk., *amgid*, *árat*, *dáat*,

*dáut*, *katábad*, *ulat*, Tag., *árat*, *dat*, Pamp., *dáhat*, Bik., *dat*, *haras*, P. Bis., *gáat*, *manged*, Iv., *ulat*, Pang., *telaíd*, Sub.; the Philippine names refer also to *S. purpurascens*.

SUMATRA. Serdang: Lörzing 9109. Batu Islands: Raap 378.

MALAY PENINSULA. Johore, Segamat: Holtum SF 38305.

JAVA and adjacent islands: Backer 27416, 31800; *Beumée* 6733; *van Borssum Waalkes* 672; *Brinkman* 582; *Buysman* 244; *Docters van Leeuwen* 5204; *Dorgelo* 83, 1749; *Horsfield s.n.*; *Kievits* 1749; *Koorders* 21165; *Kostermans & van Woerden* 102; *Labillardière s.n.*; *Leschenault s.n.*; *Mousset* 569; *Ploem* 6483; *van Straelen* 17; *Zollinger* 470.

LESSER SUNDA ISLANDS: *Bloembergen* 3680; *Buwalda* 4795; *de Castro* LXXI; *Colfs* 313; *Iboet* 470; *Jaag* 1549; *Leschenault s.n.*; *Monod de Froideville* 1937; *Sarip* 121; *Soehanda* 101; *de Voogd* 2529.

BORNEO and adjacent islands: *Cuadra A* 3087; *Gibbs* 2665; *van Steenis* 745 p.p., 990.

PHILIPPINES: *Ahern's coll.* 3313; *Barthe s.n.*; *Bermejos* 353; *Borden* FB 1929; *Clemens* 144, 1854, 18013; *Copeland* 95, 591; *Cuming s.n.*; *Ebalo* 1083; *Edaño* PNH 11916, PNH 17924; *Elmer* 5538, 6677, 8123, 12717, 16088; *Fénix* BS 3747, BS 3950, BS 12640, BS 24958; *Fox* PNH 8967; *Foxworthy* BS 24, BS 853; *Frake* PNH 35961; *Gachalian* PNH 33585; *Gaudichaud* 83; *Hallier* 4042; *Herre* 1158; *King, herb.* *Hance* 8973; *Loher* 809, 810; *MacGregor* 119, BS 1742; *Marche* B 69; *Mendoza* PNH 18442; *Merrill* 91, 528, 550, *Sp. Blanc.* 680, 1253, 7299, 8113; *Otanés* BS 17992; *Perrotet s.n.*; *Ramos Phil. Pl.* 1455, BS 26971, BS 27229, BS 76840, BS 80081; *Ramos & Dero* BS 22531; *Ramos & Edaño* BS 31169, BS 44329, BS 46803, BS 47190, BS 48126, BS 49189; *Santos* 4071, 4709, 4982, 5182; *Sulit* PNH 11806; *Topping* 458, 460; *Vidal* 1936; *Wenzel* 1691; *Whitford* 34; *Williams* 1.

CELEBES and adjacent islands: *Bünne-meijer* 10836; *Docters van Leeuwen* 1504, 1854; *Elbert* 3430; *Eyma* 4062; *van der Gaag* 70; *Kaudern* 115, 413; *Koorders* 16659, 16673, 16675, 16676, 16684, 16685, 16692; *Rachmat* 51; *Reyne s.n.*; *de la Savinière* 175; *van Steenis* 10358; *Teysmann* 11847, 13820, 14167.

MOLUCCAS: *Anang* 55, 167, 505; *Atje* 15; *Barclay s.n.*; *Beguin* 887, 1787; *Bloembergen* 4436; *Boerlage* 30, 72, 199; *Forsten s.n.*; *Jensen* 157; *Kostermans* 906, 957; *Labillardière s.n.*; *Lam* 2520, 3152; *Pleyte* 62; *Saanán* 102; *Treub* 387; *d'Urville s.n.*

NEW GUINEA and adjacent islands: *Brass* 5322, 6244, 7590, 7715, 727949 (see p. 180); *Buwalda* 5494; *Carr* 11319; *Gaudichaud (A1)* 36, *s.n.*; *Hoogland* 3363 (BO, K, L); *Koch L. B.* 909.89-44; *Lam* 836; *Lauterbach* 513; *Ledermann* 6861; *Pleyte* 910; *Schram* BW 7738; *d'Urville* 1.

# 16a. *ssp. discocarpa* Kern, subspec. nov. — *Fig. 6e.*

*Nux parva*, glumis brevior, valde depresso-globosa, haud vel vix umbonata, laevis vel leviter reticulata, lactea,  $1\frac{1}{2}$  mm longa,  $2-2\frac{1}{3}$  mm lata; discus luteus, nuce aequilatus. Culmi leaves; folia glabra, apice scabrida, caetèrum leaves vel marginibus scabridis, vaginis glabris laevibusque, distincte alatis. Spiculae femineae late ovatae, basi late rotundatae, 3 mm longae et latae. Inflorescentia laxa, ampla, 50—70 cm longa.

Type: New Guinea: *Docters van Leeuwen* 11153 (L).

NEW GUINEA. W. New Guinea. Mamberamo River, Pioneer bivouac, in water: *Chr. Versteegh* 48 (BO, K, L); Van Rees-Gauttier mountains, water-side, on alluvial river-clay: *Feuilletau de Bruyn* 201 (BO, L); Meervlakte, Motorbivouac, bank of Bruine Rivier, alt. 100 m: *Docters van Leeuwen* 11153 (BO, SING, L). NE. New Guinea. Sepik Distr.: *Ledermann* 6782 (SING). Papua. Fly River: *d'Albertyn* in 1876 (FI).

The following collections may also belong here, but they are only in young flowers.

MOLUCCAS. Halmaheira. Telago Rano: *Idjan & Mochtar* 261 (BO, L). Ceram. Telaga Sawan, near Wae Samae: *Eyma* 2934 (BO, L).

NEW GUINEA. Papua. Lake Daviumbu, Middle Fly River, savannahs, on swamp margins: *Brass* 7663 (BO), 7715 (BO, U).



**Note.** Very striking by the perfectly smooth stems and sheaths, the slender inflorescence, the broad female spikelets, and the minute, much depressed nuts. As in the following collections either the nut is less depressed or the inflorescence stiffer, it seems appropriate to treat this taxon as a subspecies of *S. scrobiculata*.

**NEW GUINEA.** W. New Guinea. Bernhard bivouac, temporarily flooded clayish soil, alt. 50 m: *Meijer Drees* 360 (BO). **PAPUA.** Lake Daviumbu, Middle Fly River, forming dense thickets 2½—3 m high in edge of forest along lake-shore: *Brass* 7590 (BO, U).

**17. *Scleria purpurascens*** Steud., Syn. 2, 1855, 169; Miq., Fl. Ind. Bat. 3, 1856, 342; F.-Vill., Nov. App. 1882, 310. [T.: Java: *Goering* 167 (P)]. — *S. scrobiculata* (non Nees) Mor., Syst. Verz. 1846, 98, p.p. (quoad *Zollinger* 377). — *S. pubescens* Zoll., Syst. Verz. 1, 1854, 61, p.p., nom. nud., non Steud. — *S. sumatrensis* (non Retz.) Miq., Fl. Ind. Bat. 3, 1856, 343; Ridl. & Winkl., Bot. Jahrb. 44, 1910, 525. — *S. multifoliata* Boeck., Linnaea 38, 1874, 510; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 18; Clarke, Fl. Br. Ind. 6, 1894, 693; J. Linn. Soc., Bot. 34, 1898, 102; Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 228; Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 112; Clarke, Philip. J. Sc. 2, 1907, Bot. 106, p. min. p.; Ill. Cyp. 1909, t. 129 f. 3; Camus, Fl. Gén. I.-C. 7, 1912, 169; Merr., En. Born. 1921, 66; Ridl., Fl. Mal. Pen. 5, 1925, 178; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 55. [T.: Java: *Zollinger* 470, p.p.; Malacca: *Griffith* (K, NY); Tenasserim & Andamans: *Helper* 6132 (C, L, NY, P)]. — *S. multifoliata* var. *pilosula* Clarke, Fl. Br. Ind. 6, 1894, 693; J. Linn. Soc., Bot. 34, 1898, 103; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 112; Fl. Mal. Pen. 5, 1925, 179. [T.: Java: *Zollinger* 470, p.p.; Penang: *King's coll.* (K, dupl. in L)]. — *S. purpureovaginata* (non Boeck.) Merr., En. Philip. 1, 1923, 135, p.p.; Elm., Leaf. Philip. Bot. 10, 1938, 3540.

**var. *purpurascens* — Fig. 6f.**

Perennial with thick, shortly creeping, woody rhizome. *Stems* usually robust (but slender plants occur), erect, triquetrous, pubescent or glabrous, smooth or scabrid on the angles, up to 2 m tall and 7 mm thick. *Leaves* in the middle part of the stems and lower bracts clustered, in pseudo-whorls of 2—5, rigid, patent, gradually narrowed upwards, scabrous on the margins and the main nerves in the upper part, usually more or less pubescent especially beneath, rarely glabrous, 3—14 mm wide; sheaths usually pubescent, triquetrous, not winged, often purplish; contraligule short, broadly rounded, hirsute-ciliate. *Inflorescence* oblong, up to 50 cm long, consisting of a terminal panicle and up to 10 lateral ones, ultimately purple; lateral panicles solitary at the nodes or up to 4 together, pyramidal, on erect, long peduncles, with patent, scabrid branches; primary bracts foliaceous, shorter than to about as long as the inflorescence, secondary ones long, setaceous, ciliate at the dilated base. *Spikelets* 2—3 together, unisexual; male spikelets peduncled, lanceolate, 3—3½ mm long; stamens 3; anthers linear, 1½—2 mm long, with long, conical, somewhat bristly appendage of the connective; female spikelets at the base of the branchlets, obovoid when in fruit, cuneate at the base, 3½—4 mm long; male part reduced to a sterile glume. Cupula much smaller and thinner than in *S. sumatrensis*. *Disk* 3-lobed, triangular when flattened out, thick, yellow-brown; lobes triangular, obtuse, c. ⅓—⅓ as high as the nut, denticulate-crenulate at

the top. *Nut* small, not exerted from the glumes, ovoid, rather narrower than in the related spp., hirtellous at the top, glabrescent, finally dingy purplish to blackish, 2—2½ mm long, c. 2 mm wide.

**Distribution:** Burma, Thailand, Indo-China; in Malaysia: Sumatra and adjacent islands, Malay Peninsula, W. Java, very rare in Central Java, Borneo, Philippines (Palawan, Culion, Luzon, Samar, Leyte, Mindanao), Celebes (SE. Peninsula).

**Ecology:** In sunny and moderately shady localities, in secondary forests, brushwood, swampy grasslands, along roads, at low and medium altitudes, up to 1000 m.

**Vernacular names:** *Rumput sasayang*, *r. sranit*, Mal. (Mal. Pen.), *daun kerisan*, Mal., *senayan* (Lingga), *rumput belidang* (Enggano), *perèdang* (Kutei), *tali juru* (N. Borneo).

**SUMATRA** and adjacent islands: *Anta* 438 p.p., 1081; *Bartlett & La Rue* s.n.; *van Borssum Waalkes* 1436, 1842; *Bünnemeijer* 113, 152, 1215, 1612, 1715, 6004, 6048, 6329, 6462, 6620, 6942, 7449, 7569, 7661, 7834; *Djadoek* 1121; *Docters van Leeuwen* 3234; *Hamel* 1126; *Henderson* SF 20241, SF 20289; *Huitema* 10; *Junghuhn* 485, 501; *Karta* 5; *Kobus* s.n.; *Koorders* 21505; *Lörzing* 5413, 12508; *Lütjeharms* 4211; *Nielsen* 1066; *Polak* 130; *Posthumus* 451; *Praetorius* s.n.; *Rahmat si Boea* 1400, 1829, 6064, 9115; *Rappard* 89; *Rutten-Kooistra* 26; *van Steenis* 745 p.p., 845, 1066, 3377, 3856, 3857; *Surbeck* 70, 465; *Thorenaar* 158; *de Voogd* 1152, 1184; *van der Voort* 1; *Vorderman* s.n.

**MALAY PENINSULA** and adjacent islands: *Birch* 62; *Burkill* HMB 176, SF 921, SF 6439; *Burkill & Haniff* SF 13723, SF 15652; *Burkill & Shah* HMB 176; *Corner* SF 25908; *Curtis* 22 (= 1394); *Debeaux* 32; *Gaudichaud* 91 p.p., 92 bis, 120; *Goodenough* 1920, 10464; *Griffith* 6117, 6132; *Hume* 7447, 8707, 8960; *King's coll.* 1544, 1656; *Lake & Kelsall* 4098; *Machado* 11543; *Mohammed* FMS 21160; *Mohd Nur* 4795, FMS 21630; *Mohd Nur & Kiah* SF 7795; *Nauen* SF 35874, SF 38009, SF 38010, SF 38050, SF 38176, SF 38178; *Ridley* 2146, 6113, s.n.; *Samsuddin* FMS 42319; *Symington* 21413; *Seimund* 101, 113, 444, 541, 13195; *Sinclair* SF 39336; *Stoliczka* s.n.; *Vesterdal* 50, 582, 674; *Walker* 242; *Wyatt Smith* 55820.

**W. JAVA** and adjacent islands: *Backer* 1320, 1995, 3072, 10483, 14359, 18906, 23631, 26493, 35175; *Bakhuizen van den Brink* 5342, 6567, 6849, 6858, 7429; *Bakhuizen van den Brink* f. 915, 3287; *Beumée* A 286; *Bijhouwer* 258; *Blume* s.n.; *Boerlage* s.n.; *Bosbouwproefstation* E 1188; *Buwalda* 2920; *Danser* 5644; *Goering* 167; *Hallier* 562b, c; *van Hasselt* 93; *Horsfield* s.n.; *Kooper* 919; *Koorders* 31458, 40934, 41054, 41090, 41134, 41362, 41363, 41405; *Kuntze* 5009; *Lam* 281 J; *van Ooststroom* 12594; *Raap* 839; *Scheffer* s.n.; *Soegandi* 216; *van Steenis* 5350; *de Vries* 50; *Zollinger* 335, 377 p.p.; *Zwaardemaker* Z 92 A.

**CENTRAL JAVA:** *Backer* 4468; *Beumée* 4829 (both from Banjumas).

**BORNEO** and adjacent islands: *Amdjah* 247, 352, 353; *Miss Brooke* 8007, 8305, 9028; *Burbidge* s.n.; *Castillo* 504; *Castro & Melegrito* 1347; *Clemens* 21365 p.p., 21852, 21855, 28269; *Cuadra* A 3086; *Elmer* 20380; *Endert* 1572, 1738, 2021, 2646, 3246; *Enggoh* 10520; *Forman* 420; *Hose* 29; *Jacobs* 5599; *Jaibon* A 3213; *Kadir* A 2509; *Keith* 5977, 6232; *Langlassé* 39; *Meijer* 529, 1916, 2307, 2316; *Motley* 1297; *Posthumus* 2026; *Purseglove* P 4358; *Ridley* 11684; *Rutten* 412; *van Slooten* 2169; *Villamil* 323; *Hub. Winkler* 2895; *Yates* 69.

**PHILIPPINES:** *Cid* 78; *Clemens* s.n.; *Edaño* PNH 11900, PNH 11980, BS 24819; *Edaño & Gutierrez* PNH 37850; *Elmer* 16063; *Herre* 1009; *Merrill* 7243, 8229, 9523; *Ramos & Edaño* BS 31290, BS 46801, BS 46906; *Williams* 2373.

**CELEBES:** *Eyma* 3355; *Rachmat* 662.

**17a. var. *ophirensis*** (C. B. Clarke) Kern, comb. nov. — *S. multifoliata* Boeck. *var. ophirensis* C. B. Clarke, Fl. Br. Ind. 6 (1894) 693; J. Linn. Soc., Bot. 34, 1898, 103; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 113; Fl. Mal. Pen. 5, 1925, 179. [T.: Malay Peninsula, Mt Ophir: *Hullett* 869 (K)].

Very coarse and rigid; leaves very densely aggregated in the middle of the stem, their sheaths much overlapping; lobes of the disk shorter than in the typical *S. purpurascens*.

SUMATRA and adjacent islands. TAPIANULI. Near Gunungtua, very poor soil, 100 m: *van der Voort* 17 (BO). East Coast. Bila, Aek Buro, in brushwood, 200 m: *Lörzing* 11592 (BO). Banka. G. Mangkol: *Kostermans* 767 (BO, L); *Sungei Liat: Teysmann* 6469 (BO). P. Lingga. G. Daik, in brushwood, 750 m: *Bünnemeijer* 6724 (BO). Riouw Arch. P. Karimon: *Bünnemeijer* 7884 (BO); *Ridley* 7109 (SING). St. Barbe Isl.: *Langlassé* 941 (P, SING).

MALAY PENINSULA. Kedah. Kedah Peak: *Ridley* 5148 (K). Trengganu. P. Redang: *Yapp* 306 (L). Malacca. Mt Ophir, 3000 ft: *Hullett* 869 (K); *Ridley* 3122 (K, SING), 10006 (SING).

Notes. 1. It is difficult to place this remarkable variety because of the absence of nuts in the rather numerous collections (except for a single fruit in the type). Clarke treated *Hullett* 869 as a variety of *S. multifoliata* (= *S. purpurascens* in the present paper), with the remark that perhaps it might represent a distinct species. As long as no complete fruiting material is available this seems the best solution of the question, although it is also possible that we are dealing with a systematically unimportant form from infertile soil with poor fructification and vegetative propagation. I have seen it only from a restricted area.

Similar sterile plants with very densely crowded leaves have been collected in Thailand, but they cannot belong to *S. purpurascens* because of the distinctly winged leaf-sheaths.

2. Following Boeckeler, all subsequent authors referred the name *Scleria purpurascens* Steud. to the synonymy of *S. sumatrensis* Retz. Steudel's excellent type-specimen in the Paris Herbarium leaves no doubt whatever that *S. purpurascens* is quite distinct from *S. sumatrensis* and conspecific with *S. multifoliata* Boeck.

Sect. III. *Corymbosae* Boeck. ex Pax in E. & P., Pfl. Fam. II, 2, 1888, 121; Dalla Torre & Harms, Gen. Siph. 1909, 35; Clarke, Kew Bull., add. ser. 8, 1908, 132 (type species: *Scleria corymbosa* Roxb.). — *Scleria C. Corymbosae* Boeck., Linnaea 38, 1874, 536. — *Scleria sect. Lithospermeae* Clarke in Thiselt.-Dyer, Fl. Trop. Afr. 8, 1902, 493; Kew Bull., add. ser. 8, 1908, 132; Cherm., Bull. Soc. Bot. Fr. 76, 1929, 559; in Humbert, Fl. Madag., fam. 29, 1937, 253 [type species: *Scleria lithosperma* (L.) Sw.].

18. *Scleria corymbosa* Roxb. [Hort. Beng. 1814, 103, nom. nud.]; Fl. Ind. ed. 2, 3, 1832, 574; Clarke, Fl. Br. Ind. 6, 1894, 686; J. Linn. Soc., Bot. 34, 1898, 97; Hook. f. in Trim., Handb. Fl. Ceyl. 5, 1900, 95; Clarke, Philip. J. Sc. 2, 1907, Bot. 104; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 109, p.p.; Clarke, Ill. Cyp. 1909, t. 124, f. 1—3; Merr., En. Philip. 1, 1923, 133; Ridl., Fl. Mal. Pen. 5, 1925, 176, p.p. [T.: India: Chittagong (BM)]. — *S. androgyna* Nees in Wight, Contr. 1834, 117; Kunth, En. 2, 1837, 357; Steud., Syn. 2, 1855, 168; Thwaites, En. Pl. Zeyl. 1864, 353; Boeck., Linnaea 38, 1874, 536; Ridl., J. Str. Br. R. As. Soc. no. 23, 1891, 18. [T.: India Or.: Wight 1906 (NY)]. — *S. corymbifera* Boeck., Linnaea 38, 1874, 537. [T.: Mt Khasia: Hook. f. & Thoms. hb. Ind. Or. (L, P)]. — *S. ridleyi* Clarke, Fl. Br. Ind. 6, 1894, 686; J. Linn. Soc.,



Bot. 34, 1898, 97; *ibid.* 36, 1903, 266; Ridl., *Mat. Fl. Mal. Pen.* (Monoc.) 3, 1907, 109; Clarke, *Ill. Cyp.* 1909, t. 124, f. 4; Camus, *Fl. Gén. I.-C.* 7, 1912, 160; Ridl., *Fl. Mal. Pen.* 5, 1925, 177. [T.: Singapore: *Ridley 1641* (K, SING)]. — *Fig. 6 g.*

Perennial with horizontal rhizome clothed by brown scales. *Stems* often robust (but slender specimens not rarely occur), erect, triquetrous, glabrous, smooth or scaberulous in the upper part, leafy throughout, up to 2 m by 1 cm. *Leaves* subcoriaceous, rigid, flat, exactly linear, abruptly narrowed to the obtusish tip, glabrous, smooth or somewhat scaberulous on the margins near the top, 7—25 mm wide; sheaths loose, triquetrous, not winged, smooth or scaberulous on the angles, glabrous; contraligule broadly ovate-triangular, glabrous, with a broad, fuscous, scarious margin. *Inflorescence* often copious, up to 75 cm long, leafy, consisting of a few to several distant fascicles of panicles; lateral panicles 2—3 together at the nodes, rarely solitary, dense, decomposed, corymbiform, with patent branches; peduncles very unequal, compressed, up to 10 cm exerted from the sheaths; primary bracts leafy, erect, the lower ones usually overtopping the inflorescence; secondary bracts subulate. *Spikelets* bisexual and male, stramineous to dark brown, sessile, 4—5 mm long; male spikelets lanceolate; stamens 3; anthers c. 2 mm long, with a subulate appendage of the connective; bisexual spikelets broadly ovoid, with some male flowers besides the female one. *Disk* obsolete, reduced to a brown or reddish, narrow, triangular, minutely glandular band concrete with the nut. *Nut* ovoid, obtusely trigonous, with 3 shallow depressions at the base, acute, hardly or not umbonulate, shining, snowy white, rarely somewhat discoloured, 3—3½ by 2—2½ mm.

**Distribution:** From India and Ceylon to S. China, W. and NW. Malaysia, everywhere very local.

**Ecology:** In damp shady localities, in swamp forests, but also in wet places in the open, at low altitudes, up to 300 m.

**Vernacular names:** *Ilat badak*, Sund., *si marpandanpandan*, *si anit tombak*, *korisan*, Sum. E. C.

SUMATRA. East Coast Res.: *Rahmat si Boeea* 1858, 2726, 4514 (NY). Tapanuli: *Rahmat si Boeea* 5536 (NY). Banka: *Bünneimeijer* 1665 (BO); P. Lingga: *Bünneimeijer* 7048 (BO, L).

MALAY PENINSULA. Kedah. Lubok Jerai: *Sow CF* 34683 (KEP). Perak: *King's coll.* 1092 (L); Dindings: *Ridley* 8357 (SING), 10294 (K, SING). Malacca: *Griffith Kew Distr.* 6116 (K), *s.n.* (CGE); *Ridley* 10746 (SING); *Sinclair SF* 40562 (SING). Johore: *Feilding s.n.* (SING); *Teruya* 2585 (SING); P. Langkawi: *Corner s.n.* (BM, BO, K, L, SING); *Robinson* 6314 (BM, K, SING). Penang: *Curtis* 490 (K, SING). Singapore: *Ridley* 1641 (K, SING), 2131 (BM, K, SING).

W. JAVA. Gunung Kantjana: *Koorders* 41052 (BO); Tjitjadas: *van Steenis* 5363 (BO).

PHILIPPINES. Palawan: *Merrill* 9402 (BM, BO, K, L, NY, P, SING). Culion: *Merrill* 656 (BM, K, NY, SING).

**Notes.** 1. Ridley's remark (1907, 1925) that the lower sheaths are sometimes strongly winged, refers to a stout form of *Scleria terrestris* (*S. radula* Hance).

2. *Scleria ridleyi* Clarke is merely a slender, more or less depauperated condition of *S. corymbosa*. I fail to see any difference in the nuts (Clarke stated that they are "rather more pointed").

19. *Scleria lithosperma* (L.) Sw., Prodr. 1788, 18; Nees in Wight, Contr. 1834, 117; Kunth, En. 2, 1837, 349; Mor., Syst. Verz. 1846, 98; Zoll., Syst. Verz. 1, 1854, 61; Steud., Syn. 2, 1855, 173; Miq., Fl. Ind. Bat. 3, 1856, 344, incl. *var. β*; Boeck., Linnaea 38, 1874, 451; Benth., Fl. Austr. 7, 1878, 429; F.-Vill., Nov. App. 1882, 310; Vidal, Phan. Cuming. 1885, 156; Rev. Pl. Vasc. Filip. 1886, 285; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 17; Clarke, Fl. Br. Ind. 6, 1894, 685; J. Linn. Soc., Bot. 34, 1898, 96; *ibid.* 36, 1903, 265; K. Sch. & Laut., Nachtr. 1905, 60; Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 227; Clarke, Philip. J. Sc. 2, 1907, Bot. 103; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 108; Clarke, Ill. Cyp. 1909, t. 123, f. 1—4; Ridl., J. Str. Br. R. As. Soc. no 59, 1911, 225; Valck. Sur., Nova Guinea 8, 1912, 711; Merr., Fl. Manila 1912, 120; Camus, Fl. Gén. I.-C. 7, 1912, 161, f. 21, 5; Stapf & Turr. in Gibbs, J. Linn. Soc., Bot. 42, 1914, 182; Merr., En. Born. 1921, 66; En. Philip. 1, 1923, 133; Kük., Bot. Jahrb. 59, 1924, 9, 58; Ridl., Fl. Mal. Pen. 5, 1925, 176; Core, Brittonia 2, 1936, 27; Elmer, Leaflet. Philip. Bot. 10, 1938, 3540; Ohwi, Bot. Mag. Tokyo 56, 1942, 212; Utt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 54; S. T. Blake, J. Arn. Arb. 35, 1954, 224; Nelves, Kew Bull. no 3, 1955, 421. Based on *Scirpus lithospermus* L. — *Kaden Pullu* Rheede, Hort. Malab. 12, 1703, t. 48. — *Scirpus lithospermus* Linné, Sp. Pl. 1, 1753, 51. [T.: Habitat in India]. — *Schoenus lithospermus* (L.) L., Sp. Pl. ed. 2, 1, 1762, 65. Based on *Scirpus lithospermus* L. — *S. tenuis* Retz., Obs. 4, 1786, 13; Roxb., Fl. Ind. ed. 2, 3 (1832) 574. [T.: Ceylon, Koenig]. — *S. filiformis* Sw., Prodr., 1788, 19; Zoll., Syst. Verz. 1, 1854, 61 (*Zollinger 1166*). [T.: West Indies (cf. Core, Brittonia 2, 1936, 27—30)]. — *S. capillaris* R. Br., Prodr. 1810, 240; Kunth, En. 2, 1837, 349; Steud., Syn. 2, 1855, 173. [T.: Littora Novae Hollandiae intra tropicum, Arnhem S. Bay: *Brown 6069* (BM, K)]. — *S. glaucescens* Presl, Rel. Haenk. 1, 1828, 202; Steud., Syn. 2, 1855, 174, ex descr. [T.: In insula Luzon: *Haenke* (n.v.)]. — *Hypoporum capillare* (R. Br.) Nees, Linnaea 9, 1835, 303. Based on *Scleria capillaris* R. Br. — *Hypoporum lithospermum* (L.) Nees in Mart., Fl. Bras. 2<sup>1</sup>, 1842, 172. Based on *Scirpus lithospermus* L. — *S. wightiana* Steud., Syn. 2, 1855, 176. Based on "*Hypoporum lithospermum* Nees in Wight Arn., Contr. 117" (should be: *Scleria lithosperma*).

**var. lithosperma** — *Fig. 6 h.*

Perennial with woody, shortly creeping, nodulose rhizome. *Stems* approximate or tufted, slender, erect, triquetrous, smooth and glabrous, 40—60(—90) cm by 1—2 mm. *Leaves* rigid, often somewhat aggregated towards the middle of the stem, narrowly linear, gradually narrowed to the obtusish tip, glabrous to sparsely pubescent, keeled, with revolute, scabrid margins, glaucescent, 1—4 mm wide; sheaths narrow, triquetrous, not winged, usually pubescent in the middle of the sides and glabrous on the angles, more rarely wholly glabrous, the lower ones nearly bladeless, purplish; contraligule short, obtuse, ovate or triangular, hirsute or ciliate, up to 2 mm long. *Inflorescence* narrow, very loose, up to 30 cm long, with a terminal panicle and 2—3 distant axillary ones; panicles ascending, almost spiciform or somewhat compound, with few spikelets; primary bracts foliaceous, usually much exceeding their panicles, bracteoles setaceous or glumiform, minutely scabrid on the margins. *Spikelets* bisexual (or a few male ones added?), solitary or in clusters of 2—3, with 1 female flower and a few to several male ones, 3—5 mm long; stamens 1(—2); anthers linear,

$\frac{3}{4}$ — $1\frac{1}{2}$  mm long; glumes ovate to lanceolate, acuminate, cuspidate or mucronulate, ferrugineous. *Disk* reduced to a narrow, brown, minutely glandular ring concrete with the base of the nut. *Nut* ovoid or oblong-ovoid, obtusely trigonous, minutely umbonulate, about as long as the glumes, at the base with 3 depressions which are rugulose by transverse, wavy, ferrugineous, minutely glandular ridges, otherwise smooth and shining (see var.!),  $2$ — $2\frac{2}{3}$  by  $1\frac{1}{2}$ — $2$  mm.

**Distribution:** Pantropical, the most widely distributed species of the genus; throughout Malaysia.

**Ecology:** In open places, along edges of forests, on rocky and sandy beaches, at low altitudes, up to 600 m (in New Guinea, Bismarck Mts, collected at 1000 m alt.).

**Vernacular names:** *Rumput sangit*, *r. kerisan*, *r. sianit darat*, *salit kechil*, Mal., *faha tading*, Alor, *rumput luwung*, Sumbawa, *tjaka ma gaolè*, Ternate, *èri*, Halmaheira; New Guinea: *momoab*, Wanigela, *widzi*, Onjob lang., *wammoam*, Miniafia lang.; Philip.: *dàat*, *katábad*, Tag., *talaíd*, Bag.

**SUMATRA** and adjacent islands: Bartlett 8220; Bünne-meijer 2082; Kostermans 855; Lörzing 3633, 9516, 9579, 11572, 13785, 16355; Nielsen 1081; Rahmat si Boeea 923, 1757; van Steenis 3134; Veearts Sibolga 29; Yates 596, 675.

**MALAY PENINSULA** and adjacent islands: Corner SF 28157, SF 29802, s.n.; Curtis 1794; Goodenough 1299, 1926; Griffith 6129; Halim FMS 19280; Henderson SF 18459, SF 21364, SF 22467, SF 25047; Hervey s.n.; Holttum SF 17416, SF 38288; Ibrahim KF 19834; Kuntze 6172; Mohd Haniff SF 16023, SF 16024; Mohd Nur 4506, 31353; Monod de Froideville 651; Nauen SF 35863, SF 38179; Ridley 2, 1461, 3111, 10296, 14354, 15177, s.n.; Symington FMS 27770, FMS 28027, FMS 37333; Vesterdal 143; Wallich 3416 A, C.

**JAVA** and adjacent islands: Altmann 603; Backer 755, 806, 17970, 18186, 18217, 19080, 21002, 24842, 26461, 26495, 29329, 32487, 32488, 37567; Beumée A 564, 5519; van Borssum Waalkes 624; Buwalda 7550; Clason-Laarman F 43, 113; Coert 895; Dorgelo 1776 p.p.; Forman 172; Kooper 512b; Koorders 22077, 28245; Kostermans & van Woerden 175; Rant 948; van Steenis 5317; Valetton 86; Vermeulen 2; Zollinger 348, 3985.

**LESSER SUNDA ISLANDS:** Bloembergen 3112; van Borssum Waalkes 3022, 3109, 3146, 3173; Buwalda 4367; Colfs 122; Demandt & van Dillewijn 664; Jaag 1428; Kostermans c.s. 43; Posthumus 3379; van Steenis 7578; de Voogd 1698; Zollinger 1166.

**BORNEO** and adjacent islands: Beccari PB 1296; Clemens 9550; Fraser 1105; Gibbs 2689; Henderson SF 20211; Hombron s.n.; Hose s.n.; Purselglove & Mohd Shah P 4617; van Steenis 979, 992.

**PHILIPPINES:** Cumíng 1817; Edaño PNH 11057, PNH 11109, PNH 11675; Elmer 11071, 17351; Hallier 4569; Leiberg 6144; McGregor BS 10120; Merrill 548; Ramos Phil. Pl. 1804, BS 8040, BS 32702, BS 32750; Ramos & Edaño BS 44282, BS 48992; Robinson & Ramos BS 11904; Whitford 603.

**CELEBES** and adjacent islands: Eyma 3424; Kjellberg 384, 438; Nielsen 810; Posthumus 2661.

**MOLUCCAS:** Anang 458, 619; Beguin 878, 1176, 1785; Buwalda 6030; Robinson Pl. Rumph. 435; Teymann s.n.

**NEW GUINEA** and adjacent islands: Atasrip 164; Beccari PP 99; Brass 1634, 6259, 8059; Buwalda 5060, 5302; Crutwell 158; Hellwig 269; Hoogland 4709; Kanehira & Hatusima 13193; MacKee 1787; Naumann 111; Peekel 31; Pleyte 810; Reeder 843; van Royen 5340; Schlechter 13755, 13967; Zippel s.n.

**19a. var. linearis** Benth., Fl. Austr. 7, 1878, 430. [T.: Queensland, Brisbane R.: F. Müller (K)]. — *S. lithosperma* var.  $\beta$  Thwaites, En. Pl. Zeyl. 1864, 354. [T.: Thwaites CP 2627 (CGE, BM, BO, K, P)]. — *Hypoporum roxburghianum* Nees ex Boeck., Linnaea 38, 1874, 452, in syn. — *Hypoporum roxburghii* Nees ex Clarke, Fl. Br. Ind. 6, 1894, 686, in syn. — *S. lithosperma* var. *roxburghii* Clarke, Fl. Br. Ind. 6, 1894, 686; J. Linn. Soc., Bot. 34, 1898, 97;



Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 109; Clarke, Philip. J. Sc. 2, 1907, Bot. 104; Ill. Cyp. 1909, t. 123, f. 5; Merr., En. Philip. 1, 1923, 133; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, fam. 246, 1949, 54. [T.: *Thwaites CP 2627* (CGE, BM, BO, K, P)]. — *S. roxburghii* (Clarke) Domin, Bibl. Bot., Heft 85, 1915, 487; S. T. Blake, J. Arn. Arb. 35, 1954, 224. Based on *S. lithosperma* var. *roxburghii* Clarke. — *S. roxburghii* var. *australiensis* Domin, Bibl. Bot., Heft 85, 1915, 487. Based on *S. lithosperma* var. *linearis* Benth. — Fig. 6 i.

Whole surface of the nut rugulose by transverse wavy ridges, which are somewhat viscid on the upper margin.

**Distribution:** From Ceylon and India through Thailand and Indo-China to tropical Australia; according to Boeckeler also in Fiji; in Malaysia: Malay Peninsula (Johore, Dindings), Bawean, Luzon, Golo, Lesser Sunda Islands (Sumba, Wetar), Papua.

**Note.** The additional characters often given for discrimination are unreliable.

**MALAY PENINSULA.** Dindings. Lumut: *Ridley 7261* (SING). Johore. Batu Pahat, Minyak Buku: *Ridley 10995* (SING); Hulu Batu Pahat: *Lake & Kelsall s.n.* (SING).

**BAWEAN:** *Dorgelo 10* (L).

**LESSER SUNDA ISLANDS.** Sumba. Laoro: *Iboet 336* (BO). Wetar. Near Ilwaki: *Bloembergen 3658* (BO, L); Mèta Leraï—Mèta Lahèla: *Bloembergen 3638* (BO, K, L, SING).

**PHILIPPINES.** Luzon. Luzon Central: *Loher 805, 806* (K); prov. Bataan, Lamao F. R., Mt Mariveles: *Merrill 3176* (K, P); *Williams 145* (NY); prov. of Rizal, Antipolo: *Ramos Phil. Pl. 535* (FI, U). Golo: *Merrill 11543* (BO, K, L, P, SING).

**NEW GUINEA.** Papua. Kanosia: *Carr 11035* (K, L, NY, SING); Tarara, Wassi Kussa R.: *Brass 8504* (BM, BO, U); Baroka, Mekeo distr.: *Brass 3774* (BO, L, NY).

#### Sect. IV. *Carphiformes* Kern, sect. nov.

Spiculae magnae, lanceolatae, dense conglomeratae, stricte unisexuales, glumis patentibus-hirsutis. Nux perminuta, glumis multo brevior, dense tuberculata (typus: *Scleria carphiformis* Ridl.).

**20. *Scleria carphiformis* Ridl., J. Fed. Mal. St. Mus. 6, 1915, 194; Fl. Mal. Pen. 5, 1925, 180.** [T.: Kedah: *Ridley 5146* (SING; dupl. in BM, K)]. — *S. neesii* (non Kunth) Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 227. — *S. neesii* var. *borneensis* Clarke ex Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 115; Merr., En. Born. 1921, 66; H. Pfeiff. in Fedde, Rep. 26, 1929, 262. [T.: Kedah: *Ridley 5146* (SING; dupl. in BM, K). No Bornean collection cited]. — *S. neesii* var. *hirsutissima* Camus, Fl. Gén. I.-C. 7, 1912, 164. [T.: Cochinchina: *Thorel 566* (P)]. — Fig. 6 j.

Probably perennial, with very short rhizome and thickish, dark red roots. Stems slender, tufted, erect, triquetrous, smooth, retrorsely hirsute especially on the middle of the sides, to glabrous, 10—40 cm by  $\frac{1}{2}$ —1 mm. Leaves aggregated towards the base of the stems, herbaceous, usually much overtopping the stem, exactly linear with obtuse tip, the midrib very prominent beneath, 2 lateral nerves prominent above, smooth, pubescent with long, white or greyish, patent hairs, sometimes glabrescent, 3—5 mm wide; sheaths narrow, triquetrous, pubescent, not winged, the lower ones purplish, bladeless or almost so; mouth of sheaths truncate or emarginate, not appendaged. Inflorescence consisting of a very dense, globose or semiglobose, terminal cluster of spikelets 1—2 cm across, and 1—2 smaller clusters (sometimes reduced to a single spikelet) lower down on

the stem, on capillary, more or less exerted peduncles in the axil of a leaf-like bract. *Spikelets* strictly unisexual, the nut-bearing ones without a trace of a male part, large, 8—9 mm long, ferrugineous or rufescent; male spikelets lanceolate, narrow, acute; stamens 3; anthers linear, 3 mm long, with reddish, bristly appendage of the connective; female spikelets ovate-lanceolate; glumes 5—6, lanceolate, acute, muticous, pubescent with long patent hairs especially near the margins and on the keel; style 3 mm. Cupula thick, large,  $1\frac{1}{2}$ —2 mm. *Disk* almost as wide as the nut, not or hardly lobed, pale. *Nut* globose, distinctly apiculate by the remainder of the style, with 6 pits at the base, densely tuberculate, stellately hairy on the top of the tubercles, dull, white or greyish brown,  $1\frac{1}{2}$ — $1\frac{2}{3}$  mm across.

**Distribution:** Cochinchina; in Malaysia: Malay Peninsula (Kedah: Kedah Peak; Trengganu: Padang Kandis; Pahang: Gunong Tahan), Borneo, SE. Celebes (Rumbia).

**Ecology:** On Kedah Peak in grassy spots surrounded by forest, on G. Tahan abundant on slightly damp, exposed rocks and screes, in Padang Kandis in sandy glam forest, in Celebes in moist monsoon forest; at low altitudes, up to 900 m.

**MALAY PENINSULA.** Kedah. Kedah Peak: *Evans & Gordon 22* (SING); *Holtum SF 15029* (SING); *Ridley 5146* (BM, K, SING). Trengganu. Padang Kandis, road to Kampong Temila, Besut: *Sinclair & Kiah bin Salleh SF 40432* (BO, K, L, SING). Pahang. Gunong Tahan: *Ridley 16033* (K, SING).

**BORNEO.** Without precise locality: *Motley 261* (as *Barber 261*, cf. Fl. Mal. I, 1, 1950, 36, sub Barber). Sarawak. Bako National Park, Lintang Path: *Sinclair & Kadim bin Tassim 10309* (L).

**SE. CELEBES.** Rumbia, Wambakowu: *Elbert 3084* (L).

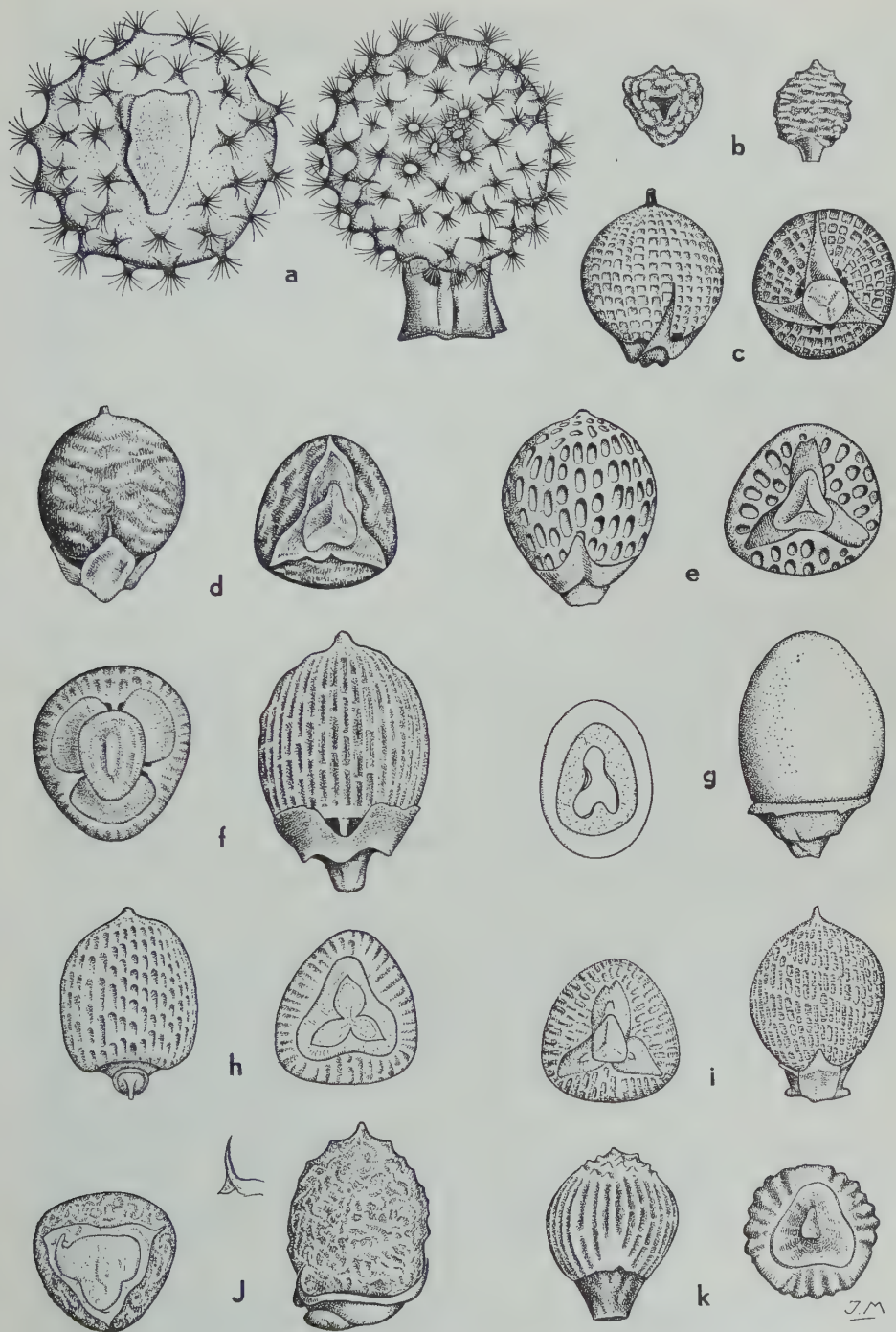
**Notes.** 1. The Kedah Peak plants are much less hairy than the others.

2. The specimens collected in Borneo by Motley were annotated by Clarke as follows: "Close to *Neesii*. *Scleria borneensis* sp. nova. Type of species. C. B. Clarke ms. Aug. 1890." Afterwards the name was changed into "*Scleria Neesii* var. *Borneensis*". Ridley published the latter name without citing Motley's collection, which he had not seen. Therefore *Ridley 5146* (SING) must be considered the type of the variety and also of *S. carphiformis* Ridl.

3. In my opinion Ridley was perfectly right in raising the taxon to specific rank. It differs from *Scleria neesii* in several important characters, which appear to be very constant.

21. *Scleria neesii* Kunth, En. 2, 1837, 358; Steud., Syn. 2, 1855, 175; Thwaites, En. Pl. Zeyl. 1864, 354; Boeck., Linnaea 38, 1874, 449; Clarke, Fl. Br. Ind. 6, 1894, 688, excl. specim. born.; J. Linn. Soc., Bot. 34, 1898, 99, excl. var.; Hook. f. in Trim., Handb. Fl. Ceyl. 5, 1900, 94; Camus, Fl. Gén. I.-C. 7, 1912, 164, f. 21, 6, excl. var. *hirsutissima* Camus. Based on *Hypoporum capitatum* Nees. — *S. stricta* Moon, Cat. Pl. Ceyl. 1824, 62, nom. nud.; H. Pfeiff. in Fedde, Rep. 26, 1929, 262. — *Hypoporum capitatum* Nees, Edinb. New

Fig. 7. Nuts and disks of: a. *Scleria neesii* Kunth; b. *S. pergracilis* (Nees) Kunth; c. *S. biflora* Roxb. ssp. *biflora*; d. *S. biflora* Roxb. ssp. *ferruginea* (Ohwi) Kern; e. *S. mikawana* Makino; f. *S. tessellata* Willd.; g. *S. annularis* Steud.; h. *S. novae-hollandiae* Boeck.; i. *S. parvula* Steud.; j. *S. tricuspidata* S. T. Blake; k. *S. laxa* R. Br. — a  $\times 20$ , b—k  $\times 10$ .





Phil. J. 17, no 34, 1834, 267; in Wight, Contr. 1834, 118; Linnaea 9, 1835, 303. [T.: Ceylon: *Macrae* (CGE)]. — *S. capitata* (Nees) H. Pfeiff. in Fedde, Rep. 26, 1929, 262, in syn., non Willd. (1805). — *Fig. 7 a*.

Very similar in habit and closely related to *S. carphiformis* Ridl., but undoubtedly specifically distinct from this. Usually smaller (rarely up to 30 cm tall), with narrower leaves 2—3 mm wide, and copiously pubescent all over with long, white or greyish, patent hairs. *Leaves* from much shorter than to about as long as the stems. *Inflorescence* consisting of a terminal cluster 1—1½ cm wide; no axillary clusters in the axil of the foliaceous bract, which therefore has become an ordinary leaf near the top of the stem. *Spikelets* usually slightly smaller, 6—8 mm long; glumes of female spikelets 4, distinctly mucronulate, hairy all over; anthers 1½ mm long; appendage of the connective smooth or nearly so. Style c. 2 mm long. Cupula small, c. 1 mm wide. *Disk* very small, much narrower than the nut, columnar, triquetrous, with a strong rib on each side, forming a stipe under the nut. *Nut* not or hardly apiculate (the remainder of the style not longer than the tubercles on the nut).

*Distribution*: Ceylon, Thailand, Cochinchina, Tonkin, Laos, Annam; in Malaysia: only in the Malay Peninsula (Perlis: Bukit Ketri), once collected, together with *Scleria thwaitesiana*.

*Ecology*: On Bukit Ketri in swampy places in "heath", at low altitudes.

*MALAY PENINSULA*. Perlis. Bukit Ketri: *Henderson SF 22964* (K, SING).

**Sect. V. Hypoporum** (Nees) Endl., Gen. Plant. 1836, 112<sup>1</sup>). — *Hypoporum* Nees, Edinb. New Phil. J. 17, 1834, 266 (type species: *Hypoporum pergracile* Nees); Wight, Contr. Bot. Ind. 1834, 118; Linnaea 9, 1835, 303. — *Scleria subgen. Hypoporum* (Nees) Clarke in Hook. f., Fl. Br. Ind. 6, 1894, 685; in Thiseit.-Dyer, Fl. Cap. 7, 1898, 293 et Fl. Trop. Afr. 8, 1902, 493; Kew Bull., add. ser. 8, 1908, 131; Cherm. in Humbert, Fl. Madag., fam. 29, 1937, 248. — *Scleria sect. Spicatae* Boeck. ex Pax in E. & P., Pfl. Fam. II, 2, 1888, 121, p.p.; Dalla Torre & Harms, Gen. Siph. 1900, 35. — *Scleria sect. Pergraciles* Clarke, Kew Bull., add. ser. 8, 1908, 131, nom. nud. — *Scleria sect. Hirtellae* Clarke, l. c. p. 132; Cherm., Bull. Soc. Bot. Fr. 76, 1929, 556; in Humbert, Fl. Madag., fam. 29, 1937, 249.

**22. Scleria pergracilis** (Nees) Kunth, En. 2, 1837, 354; Steud., Syn. 2, 1855, 176; Thwaites, En. Pl. Zeyl. 1864, 354; Boeck., Linnaea 38, 1874, 438; Clarke, Fl. Br. Ind. 6, 1894, 685; Clarke, J. Linn. Soc., Bot. 34, 1898, 96; Hook. f. in Trim., Handb. Fl. Ceyl. 5, 1900, 94; Clarke, J. Linn. Soc., Bot. 36, 1903, 266; Ill. Cyp. 1909, t. 121, f. 1—5; Camus, Fl. Gén. I.-C. 7, 1912, 160, f. 21, 1—4; Merr., Philip. J. Sc. 7, 1912, Bot. 75; En. Philip. 1, 1923, 134; S. T. Blake, J. Arn. Arb. 35, 1954, 224. Based on *Hypoporum pergracile* Nees. — *Hypoporum pergracile* Nees, Edinb. New Phil. J. 17, no 34, 1834, 267; in Wight, Contr. 1834, 118; Linnaea 9, 1835, 303. [T.: Silhet: *Wallich 3406* (CGE; dupl. in L, P)]. — *Fig. 7 b*.

Annual with fibrous, stramineous to reddish roots. *Stems* very slender, tufted, erect, triquetrous, glabrous and smooth, 25—50 cm by ½—1 mm. *Leaves*

<sup>1</sup>) Though l. c. not expressly stated, Endlicher's name was intended as a sectional one; cf. p. 345, Obs. sub *Aristolochia*.

rigid, flat or with revolute margins, narrowly linear, acutish, glabrous, scabrid towards the top,  $\frac{1}{2}$ —2 mm wide; sheaths narrow, triquetrous, not winged, smooth, glabrous or sparsely pilose, truncate at the mouth or with a very short membranous appendage. *Inflorescence* linear, unbranched, spiciform, with triquetrous, smooth or antrorsely scabrid rachis, consisting of 5—25 clusters of spikelets; clusters almost sessile, small, erect, with 2—5 spikelets, the lower ones 1— $1\frac{1}{2}$  cm distant, upper ones subcontiguous; bracts inconspicuous, not or hardly longer than the clusters of spikelets in their axils, membranous. *Spikelets* bisexual, small, obovate,  $2\frac{1}{2}$ —3 mm long; glumes ovate-lanceolate, acute, muticous, keeled, glabrous, densely beset with reddish glandular streaks, those of the male flowers thinly membranous; stamens 2; anthers linear, c. 1 mm long, with bristly appendage of the connective. Cupula very small (c.  $\frac{1}{2}$  mm), triangular. *Disk* obsolete, concrete with the nut, forming a brown triquetrous stipe  $\frac{1}{3}$ — $\frac{1}{2}$  mm high. *Nut* much shorter than the glumes, obtusely trigonous, slightly depressed, apiculate, lacuno-rugose, and tuberculate especially towards the top, glabrous, shining, white, 1— $1\frac{1}{3}$  mm long and wide.

**Distribution:** India, Ceylon, Thailand, Indo-China, Yunnan, tropical Africa; in Malaysia very rare: Sumatra (Karo Plateau), Philippines (Luzon: Bontoc; Mindanao: Cotabato), NE. New Guinea.

**Ecology:** On open slopes, at edges of swamps, in savannahs, at low and medium altitudes, up to c. 1500 m.

**Vernacular names:** *Sajat-sajat djelma*, Sum.; *kamiwa*, NE. New Guinea, Manki lang.; *bangbangló*, Philip., Bon.

**SUMATRA.** East Coast Res. Simelungan and Karolands: *Sohns* 55 (BO); Karo Plateau: *Sohns* 59 (BO); Lau Si-Momo: *Sohns* s.n. (BO, L).

**PHILIPPINES.** Luzon. Bontoc Subprov.: *Vanoverbergh* 889 (FI), 1500 (P).

**NEW GUINEA.** NE. New Guinea. Morobe Distr., near Manki village: *Miss Blackwood* 279 (K); Morobe Distr., Oomsis: *Henty* NGF 9861 (L).

**Notes.** 1. A specimen of this species in the Singapore Herbarium labelled "Java, Zollinger 348" is certainly not from Java. Specimens of this collection in other herbaria represent *Scleria lithosperma* (L.) Sw.

2. In Sumatra the strongly lemon-scented leaves are used as a remedy against fever and foot-and-mouth disease; in New Guinea they are eaten with salt.

3. The numerous spikelets I dissected were all bisexual, the ultimate one of each cluster frequently with much reduced androecium and gynoeceium, not maturing a nut. Clarke, Fl. Trop. Afr. 8, 1902, 495, described the African specimens as having also many male spikelets, similar to the bisexual ones, except that they lack the third nut-bearing glume. Also Piérart mentions the presence of strictly male spikelets. They may have mistaken the reduced ultimate spikelets for male ones.

**Sect. VI. Tessellatae** Clarke in Hook. f., Fl. Br. Ind. 6, 1894, 686; in Thiseit.-Dyer, Fl. Trop. Afr. 8, 1902, 494; Cherm. in Humbert, Fl. Madag., fam. 29, 1937, 254 (type species *Scleria tessellata* Willd.). — *Scleria subgen. Tessellatae* (Clarke) Clarke, Kew Bull., add. ser. 8, 1908, 132.

**23. Scleria biflora** Roxb., Fl. Ind., ed. 2, 3, 1832, 573; Clarke, Fl. Br. Ind. 6, 1894, 687; J. Linn. Soc., Bot. 34, 1898, 98; *ibid.* 36, 1903, 263; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 114; Clarke, Ill. Cyp. 1909, t. 127,

f. 1—2; Camus, Fl. Gén. I.-C. 7, 1912, 163, f. 21, 7; Ridl., Fl. Mal. Pen. 5, 1925, 180; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 56. [T.: from Bengal (BM)]. — *S. tessellata* (non Willd.) Nees in Wight, Contr. 1834, 118; Kunth, En. 2, 1837, 343; Steud., Syn. 2, 1855, 169; Thwaites, En. Pl. Zeyl. 1864, 354, excl. *var. β*; Benth., Fl. Hongk. 1861, 399; Ochse & Bakh., Ind. Groent. 1931, 222; Veg. D. E. I. 1931, 221; Merr., En. Philip. 1, 1923, 135, p.p. (quoad *BS* 12221, 30025, *Philip. Pl.* 1444). — *S. propinqua* Steud., Syn. 2, 1855, 169; Miq., Fl. Ind. Bat. 3, 1856, 343. [T.: Java: *Goering* 154 (P)]. — *S. steudeliana* Miq., Fl. Ind. Bat. 3, 1856, 344; Sum. 1861, 262; Boeck., Linnaea 38, 1874, 475; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 17. [T.: Java, near Batavia; Sumatra, in Oppen-Angkola: *Junghuhn* (L, U)].

**ssp. *biflora* — Fig. 7 c.**

Annual with fibrous, dark red roots. *Stems* slender, tufted, erect, triquetrous, glabrous and smooth, leafy, (15—)30—45(—75) cm by 1—2 mm. *Leaves* herbaceous, weak, flat, exactly linear, abruptly narrowed to the obtusish tip, glabrous or sparsely pilose, scabrid on the margins in the upper part and on the midrib on the underside, 3—4(—8) mm wide; sheaths triquetrous, narrowly winged, retrorsely scaberulous on the angles or smooth, the lower ones purplish; contraligule from much broader than long to as broad as long, rounded, with narrow, membranous, ciliate margin. *Inflorescence* narrow, elongate, consisting of 2—4 panicles; terminal panicle 2—4 cm long, somewhat longer than the lateral ones, these remote, single or binate at the nodes, erect, on somewhat exerted, compressed, smooth peduncles; primary bracts erect, similar to the leaves, much longer than the panicles in their axil but usually not overtopping the inflorescence; secondary bracts subulate, 1—3 cm long. *Spikelets* either male and female, or male and bisexual; male spikelets lanceolate, 3—4 mm long; stamens 2—3; anthers c. 1 mm; appendage of the connective short, reddish, spinulose; nut-bearing spikelets obovoid, 4—4½ mm long, with 1(—2) male or barren flowers at the base. *Disk* deeply 3-lobed; lobes appressed, lanceolate, acute, gradually narrowed upwards, ferrugineous, reaching to ½ height of the nut. *Nut* globose or slightly depressed, regularly cancellate (the pits in vertical rows), beaked with the black or purplish persistent style-base, with 6 deep pits at the base (2 in each sinus of the disk-lobes), dull, white, ferrugineous-pubescent on the walls between the lacunae, (1½—)2 mm across; lacunae deep, square to broader than long.

**Distribution:** SE. Asia: from Ceylon, India, through Farther India to S. China, Formosa, Riu-Kiu Islands, eastwards to the Philippines and Celebes, southwards to Java, Madura, and Kangean.

**Ecology:** By grassy road-sides, in brushwood, as a weed in rice-fields and tea-plantations, often gregarious, at low altitudes (up to 900 m).

**Uses:** In Java the very young fragrant plants are eaten with the rice, as lalab, either raw or steamed.

**Vernacular names:** *Ilat*, *ilat huma*, *ilat lalab*, *ilat letik*, Sund., *kerisan*, Mal., *sesalit*, Alas lands.

N. SUMATRA: *Junghuhn* 506; *Lörzing* 3781, 8800, 11096, 13041; *Roesil* 671.

MALAY PENINSULA. Perak: *Hose* 47. Pahang: *Ridley* 2147. Selangor: *Hume* 7728 A. Malacca: *Goodenough* 1547. Johore: *Vesterdal* 134. Langkawi: *Corner s.n.* Penang: *Curtis* 1795; *Didrichsen* 3460; *Mohd Nur* SF 4545. Singapore: *Hose s.n.*; *Ridley* 5810, 8452, *s.n.*



JAVA: Goering 154. West Java: Backer 24098; Bakhuizen van den Brink 103, 1109, 3808, 5275, 5438, 6367, 7667, 7925, s.n.; Bakhuizen van den Brink f. 829; Boerlage s.n.; Hallier 560a, 560b; Junghuhn 540; Kern 8662; Van Ooststroom 12948; Van Steenis 5058, 6689, 11783, 12502, s.n.; de Wit 4154, 4165; Zippel s.n.; Zwaardemaker 22. Central Java: Bruggeman 852; Junghuhn 603; Kievits 1611, 1627, 2729.

KANGEAN: Backer 27756.

MADURA: Backer 20141, 20210, 20442.

BORNEO. Kuching: Hose s.n.

PHILIPPINES. Luzon: Félix BS 30025; Loher 808 p.p.; Ramos Phil. Pl. 1444, BS 12221. Alabat: Ramos & Edaña BS 48162. Panay: Ramos & Edaña BS 30956.

CELEBES. Southwest Peninsula: van Steenis 10349. Southeast Peninsula: Beccari s.n.; Kjellberg 344.

Notes. 1. The roots strongly smell of camphor or cajaput.

2. Clarke (1894, 1903) thinks that *Scleria biflora* might be regarded as a variety of *Scleria tessellata*, only differing in the minute characters taken from the lobes of the disk. It is, however, a well-marked species, readily recognizable by the globose, deeply cancellate, black-tipped nut deeply pitted between the long disk-lobes.

23a. ssp. *ferruginea* (Ohwi) Kern, Reinw. 6, 1961, 76. — *Scleria ferruginea* Ohwi, Act. Phytotax. Geobot. 7, 1938, 37; Mem. Coll. Sc. Kyoto Imp. Un. B 18, 1944, 7. [T.: Riu Kiu Islands, Iriomote: *G. Koidzumi* (KYO)] — Fig. 7 d.

Very slender, sometimes almost 1 m tall. Leaves rigid, narrow, 1—2 mm wide. Disk-lobes shorter, reaching to  $\frac{1}{3}$  height of the nut, suddenly caudate-mucronate from an ovate base. Nut at first often densely ferrugineous-tomentose; lacunae less deep, often partly longer than broad; walls between the lacunae broader; beak shorter.

Distribution: Riu Kiu Islands, Formosa, Thailand (Aran Prathet: Kerr 19565, BM, K), Cambodia (Poilane 27349, P), Malay Peninsula.

MALAY PENINSULA. Johore: Corner SF 37479 (BO, K, SING).

24. *Scleria mikawana* Makino, Bot. Mag. Tokyo 27, 1913, 57; Ohwi, Mem. Coll. Sc. Kyoto Imp. Un. B 18, 1944, 7; Nelmès, Kew Bull., no 1, 1956, 107. [T.: Japan, prov. Mikawa: Makino; Nagura]. — *S. tessellata* var.  $\beta$  Thwaites, En. Pl. Zeyl. 1864, 354. [T.: Ceylon: Thwaites CP 3033 (BM, BO, K, P)]. — *S. tessellata* (non Willd.) Boeck., Linnaea 38, 1874, 470, p.p. (Wight 2030, 2916); Clarke, Fl. Br. Ind. 6, 1894, 686, p.p.; S. T. Blake, J. Arn. Arb. 35, 1954, 225, excl. synonym. — *S. glabroreticulata* De Wild., Pl. Bequaert. 4, 1927, 230, f. 4; Piérart, Lejeunia, Mém. 13, 1953, 43, t. 2, f. 9, 10, 22. [T.: Belgian Congo: Vanderijst 2232 (K)]. — Fig. 7 e.

Annual with fibrous, dark red roots. Stems slender but firm, tufted, erect, triquetrous, glabrous and smooth or sometimes slightly scaberulous, 30—80 (—120) cm by 2—3 mm. Leaves rather rigid, flat or plicate, exactly linear, rather abruptly narrowed to the obtusish or acutish tip, glabrous, smooth or scaberulous on the margins and main nerves in the upper part,  $2\frac{1}{2}$ —4 (—7?) mm wide; sheaths narrow, triquetrous, not winged, smooth, glabrous or sparsely pubescent on the anterior side, the lower ones almost bladeless; contraligule membranous, short, semi-orbicular, ciliate. Inflorescence narrow, elongate, consisting of a terminal panicle and 1—2 lateral, remote, spike-like ones, with few spikelets, the terminal panicle somewhat longer than the lateral ones, these single

at the nodes, on scarcely exerted, stout, erect, smooth, ancipitous peduncles; primary bracts erect, similar to the leaves, longer than the panicle in their axil, upper and secondary ones subulate. *Spikelets* unisexual; male spikelets distinctly peduncled (peduncles  $\frac{1}{2}$ — $1\frac{1}{2}$  cm long, the lowest ones often curved outwards, often reddish), lanceolate, pale or stramineous, 4—5 mm long; stamens 3; anthers linear, c.  $1\frac{1}{2}$  mm, with conical, scabrid appendage of the connective; female spikelets c. 5 mm long, the glumes oblong-ovate, acute or mucronulate, more or less reddish with green keel; often a sterile glume besides the female flower. *Disk* thickish, deeply 3-lobed, yellowish or light green; lobes oblong, acute, sinuses obtuse. *Nut* globose or ovoid-globose, obscurely trigonous, minutely umbonulate, scrobiculate, 2— $2\frac{1}{4}$  by c. 2 mm; lacunae rather deep, oblong to ovate, in longitudinal rows; walls between the lacunae broad, white, finally ferruginous, forming a more or less continuous surface interrupted by the lacunae.

**Distribution:** Tropical Africa; from Ceylon and India to Japan; in Malaysia: a few times collected in New Guinea (Papua).

**Ecology:** In savannahs, on shores of lakes, by streams, in rain-forests, at low and medium altitudes, up to 1300 m.

NEW GUINEA. Papua. W. Div., Lake Daviumbu, Middle Fly River: *Brass* 7527 (U), 7875 (BM, BO, K, U), 7963 (U).

**Notes.** 1. *Scleria mikawana* is closely related to *S. tessellata* Willd. (Fig. 7 f), but in the latter (known from tropical Africa and India, not from Malaysia) the male spikelets are almost sessile, in any case distinctly longer than their peduncles, the nuts more cylindrical, less lacunose with narrower walls between the pits, and the disk-lobes broad, very obtuse, almost rectangular.

2. According to Piérart, l. c., the filaments are connate. In the flowers I examined they were more or less coherent when young, as is the case in several other species.

25. *Scleria annularis* [Kunth, En. 2, 1837, 359, nom. nud.]; Nees ex Steud., Syn. 2, 1855, 176; Boeck., Linnaea 38, 1874, 456; Clarke, Fl. Br. Ind. 6, 1894, 687; J. Linn. Soc., Bot. 34, 1898, 98; *ibid.* 36, 1903, 263, excl. specim. philipp. [T.: Ind. Or.; no specimen mentioned; Boeckeler cites "*Hook. & Thoms. hb. Ind. or.* (sub *Hypopor. Roxburghii* Nees." (P)] — *Hypoporum annulare* Nees, Linnaea 9, 1835, 303, nom. nud. — Fig. 7 g.

Annual with fibrous, dark red roots. *Stems* slender or medium, solitary or tufted, erect, very sharply triquetrous, glabrous or sparsely pubescent, retrorsely scabrous on the angles, 2—3-noded below the inflorescence, 30—100 cm by 2—3 mm. *Leaves* herbaceous, flat, gradually narrowed to the obtusish tip, glabrous or sparsely pubescent, antrorsely scabrous on the margins and the main nerves especially in the upper part, light green, 3—6 mm wide; sheaths sharply triquetrous, not winged, retrorsely scabrous, glabrous or pubescent on the anterior side; contraligule ovate or triangular, glabrous or ciliate, up to 3 mm long. *Inflorescence* narrow, elongate, consisting of a terminal panicle and 2—3 remote lateral ones, the terminal panicle 3—4 by 1— $1\frac{1}{2}$  cm, somewhat longer than the lateral ones, these single at the nodes, more rarely binate, erect, their peduncles more or less (the lowest up to 10 cm) exerted from the sheaths, smooth or scabrid, ancipitous, 2-winged at the dilated top; primary bracts erect,

similar to the leaves, much longer than the panicles in their axils, overtopping the inflorescence; secondary bracts subulate, rigid, scabrous, much exserted from the panicles. *Spikelets* almost sessile (peduncle c. 1 mm long), glabrous, bisexual and male, or the male part in the nut-bearing ones reduced to a sterile glume; male spikelets lanceolate, c. 3 mm long; stamens 2—3; anthers linear, c. 1 mm long, with conical, almost smooth appendage of the connective; nut-bearing spikelets 4 mm long; glumes broadly ovate-lanceolate, mucronulate, scabrid on the keel, pale, ferrugineous-striolate. Cupula 3-lobed, 1 mm wide. *Disk* triangular with rounded angles, not lobed, purplish punctulate; scar of cupula 3-lobed. *Nut* shorter than the glumes, ovoid, obtusely trigonous, laterally compressed, truncate at the base, obtuse, not apiculate, glabrous, very smooth and shining, white,  $2-2\frac{2}{3}$  mm long, c. 2 mm wide,  $1\frac{1}{2}-1\frac{3}{5}$  mm thick.

**Distribution:** Scattered throughout India, Central China (Hupeh: Ichang); once collected in Malaysia: New Guinea (Vogelkop, Kebar Valley).

**Ecology:** In grassland, altitude c. 540 m; possibly introduced.

**W. NEW GUINEA.** Vogelkop. Kebar valley, grassland E of aerodrome Andjai, among tall grasses, a few specimens, alt. 540 m: *van Royen* 3959 (L).

**Notes.** 1. Very similar in habit to the closely related *Scleria novae-hollandiae*, but stouter, and clearly distinct by its scabridity, and the ovoid, not apiculate, compressed, very shining nut.

2. The Philippine collection *Loher* 807, referred by Clarke to *S. annularis* (Philip. J. Sc. 2, 1907, Bot. 104), belongs to *S. novae-hollandiae*.

**26. *Scleria novae-hollandiae*** Boeck., *Flora* 58, 1875, 120; S. T. Blake, *Proc. R. Soc. Queensl.* 58, 1947, 48; J. Arn. Arb. 35, 1954, 225. [T.: Nov. Holland., Port Mackay: *Am. Dietrich* in herb. Luerssen (see S. T. Blake, *Blumea* 11, 1961, 223)]. — *S. laxa* (non R. Br.) Benth., *Fl. Austr.* 7, 1878, 428, p.p.; Domin, *Bibl. Bot.* 20, Heft 85, 1915, 488. — *S. annularis* (non Steud.) Clarke, Philip. J. Sc. 2, 1907, Bot. 104; Merr., *En. Philip.* 1, 1923, 133. — *S. merrillii* Palla, *Allg. Bot. Zeitschr.* 17, 1911, Beil., 8; Merr., *En. Philip.* 1, 1923, 134; Kük., *Bot. Jahrb.* 59, 1924, 10; Kanehira, *J. Dept. Agr. Kyushu Imp. Un.* 4, 1935, 282. [T.: Luzon: *Merrill in Kneucker, Cyp. et Junc. exsicc. no 249* (BM, C, K, L, NY, P)]. — *Fig. 7 h.*

Annual with fibrous, dark red roots. *Stems* slender, tufted, erect, triquetrous, glabrous and smooth, nodeless or 1-noded below the inflorescence, 25—45 cm by 1—2 mm. *Leaves* herbaceous, flat, exactly linear, rather suddenly narrowed to the obtusish or acutish tip, glabrous, scabrid on the margins and main nerves in the upper part, 2—4 mm wide, the lower ones reduced to the sheaths; sheaths triquetrous, not winged, smooth, shortly pubescent on the anterior side; contraligule short, rounded, with narrow, membranous, ciliate margin. *Inflorescence* narrow, elongate, consisting of a terminal panicle and (1—)2—3 very remote lateral ones, the terminal panicle somewhat longer than the lateral ones, these single at the nodes, erect, their peduncles more or less exserted from the sheaths, smooth, ancipitous, 2-winged at the dilated top; primary bracts erect, similar to the leaves, much longer than the panicles in their axils, overtopping the inflorescence; secondary bracts subulate. *Spikelets* usually unisexual, male and female, the nut-bearing ones sometimes bisexual, with 1 or 2 male flowers; male spikelets shortly peduncled (peduncle up to 3 mm long), narrowly lanceolate,



c. 4 mm long; stamens 2—3; anthers linear, 1—1½ mm long, with conical, scabrid appendage of the connective; nut-bearing spikelets 4½—5 mm long, with a barren or male flower besides the female one; glumes broadly ovate-lanceolate, mucronulate. Cupula deeply 3-lobed, 1 mm wide. *Disk* triangular with rounded angles, hardly lobed (sinuses very shallow, lobes broadly rounded), tightly appressed, greenish white; scar of cupula deeply 3-lobed. *Nut* ellipsoid or oblong-ellipsoid, with nearly parallel sides, very obtusely trigonous, truncate at the base, minutely umbonulate, smooth or slightly cancellate, glabrous, dull, white, finally often greyish,  $2\frac{1}{4}$ — $2\frac{3}{4}$  by  $1\frac{2}{3}$ —2 mm.

**Distribution:** N. and NE. Australia, Marianne Islands (Guam); in Malaysia: Philippines (Luzon), New Guinea (W. New Guinea: Hollandia; Papua).

**Ecology:** In savannahs and savannah-forests, in fallow rice-fields, on edges of swamps, at low altitudes.

**PHILIPPINES.** Luzon: *Loher* 807 (K); *Merrill in Kneucker* 249 (BM, C, K, L, NY, P); *Merrill* 9791 (BM, NY, P); *Ramos BS* 2029 (BO, NY, P); *Santos* 4638 (L).

**NEW GUINEA.** W. New Guinea. Hollandia: *van Royen* 4130 (L). Papua. W. Div., Oriomo River: *Brass* 6012 (BO, L). Daru Island: *Brass* 6427 (BM, BO, U).

**Note.** Among the *Scleria* material in the Hamburg Herbarium collected by Am. Dietrich there is no sheet agreeing with Boeckeler's description of *S. novae-hollandiae*; *Dietrich* 725 at Melbourne is therefore the neotype.

**27. *Scleria parvula*** Steud., Syn. 2, 1855, 174; Nelves, Kew Bull. no 1, 1956, 105. [T.: India Or.: *Hohenacker* 1295 (BM, K, L, P)]. — *S. tessellata* (non Willd.) Boeck., Linnaea 38, 1874, 470, p.p. (*Wallich* 3405 A; *Gardner* 951); ?F.-Vill., Nov. App. 1882, 310; Clarke, Fl. Br. Ind. 6, 1894, 686, p.p.; J. Linn. Soc., Bot. 34, 1898, 97, p.p.; *ibid.* 36, 1903, 267; Philip. J. Sc. 2, 1907, Bot. 104, p.p. (excl. *Merrill* 4370); Merr., Fl. Manila 1912, 210; Camus, Fl. Gén. I.-C. 7, 1912, 162; Merr., En. Philip. 1, 1923, 135, p.p. (quoad *Merrill* 4617; *Williams* 1970). — *S. uliginosa* Hochst. ex Boeck., Linnaea 38, 1874, 471. [T.: India Or.: *Hohenacker* 1295 (BM, K, L, P)]. — *S. fenestrata* Franch. & Savat., En. Pl. Jap. 2, 1879, 122, 549; Ohwi, Mem. Coll. Sc. Kyoto Imp. Un. B 18, 1944, 8. [T.: Japan: *Ono* (P)]. — *S. zeylanica* (non Poir.) Clarke, Philip. J. Sc. 2, 1907, Bot. 104, p.p. (quoad *Merrill* 4617). — *Fig. 7 i.*

Annual with fibrous, dark red roots. *Stems* slender, tufted, erect, triquetrous, glabrous and smooth, (10—)30—90 cm by 1—2 mm. *Leaves* herbaceous, flat, exactly linear, rather suddenly narrowed to the obtusish tip, glabrous, scabrid on the margins in the upper part, 2—5 mm wide; sheaths rather loose, triquetrous, winged, glabrous or sparsely pubescent, the lower ones bladeless or almost so; edge of wings retrorsely scabrid; contraligule short, rounded or truncate, with narrow, membranous, ciliate margin. *Inflorescence* narrow, elongate, the terminal panicle oblong, 2—4 cm long, somewhat longer than the 1—3 distant lateral fascicles, these erect or the lower ones often pendulous, 1—3 at each node, on slender, compressed, smooth or scabrid peduncles more or less exserted from the sheaths; primary bracts erect, similar to the leaves, much longer than the panicles in their axils, as long as or overtopping the inflorescence. *Spikelets* unisexual; male spikelets shortly peduncled (peduncles 1—3 mm long), lanceolate, 4—5 mm long; stamens 3; anthers linear, 1—1½ mm long, with conical, reddish, scabrid appendage of the connective; female spikelets 5 mm

long, without a barren or male flower besides the female one; glumes ovate, acute or mucronulate, stramineous with purplish margins to wholly purplish. Cupula hardly lobed, 1 mm wide. Disk 3-lobed; lobes thickish, appressed, ovate, acuminate, sometimes faintly bidentate at the top, greenish or yellowish. Nut shorter than the glumes, ellipsoid or subglobose, obsoletely trigonous, deeply cancellate, glabrous or ferrugineous-pubescent on the transverse raised lines, mucronate, shining, white,  $2-2\frac{1}{3}$  by  $1\frac{2}{3}-1\frac{4}{5}$  mm; lacunae rectangular, mostly longitudinally elongate, walls between the lacunae narrow.

**Distribution:** Tropical Africa; Nepal, India, Ceylon, Thailand, Indo-China, S. China, Japan, Korea; in Malaysia in the Philippines (Luzon) and NE. New Guinea.

**Ecology:** In swamps, wet open grasslands, in rain-forests in semi-shade, at low and medium altitudes, up to 1900 m.

**Vern.** *Drik*, New Guinea, Togoba; Philip.: *katábad*, Tag.

PHILIPPINES. Luzon. Prov. of Benguet: *Williams* 1970 (K, NY); dist. of Lepanto: *Merrill* 4617 (K); Bontoc subprov.: *Vanoverbergh* 952 (P).

NE. NEW GUINEA. Morobe Dist.: *Clemens* 8292a (B); Western Highlands, Mt Oga: *Saunders* 691 (BM, L).

28. *Scleria tricuspidata* S. T. Blake, *Blumea* 11, 1961, 220. [T.: Queensland: *S. T. Blake* 5291 (BRI)]. — *S. tessellata* var. *debilis* Benth., Fl. Austr. 7, 1878, 430. [T.: Rockingham Bay: *Dallachy*]. — *S. benthamii* (non Clarke) S. T. Blake, Proc. R. Soc. Queensl. 8, 1947, 50. — Fig. 7 j.

Annual with fibrous, dark red roots. Stems very slender, tufted, erect, triquetrous, glabrous or somewhat pubescent, usually retrorsely scabrid, sometimes almost smooth, nodeless or 1-noded below the inflorescence, (10—) 30—80 cm by 1—2 mm. Leaves (i.e. those not subtending a panicle) often all reduced to bladeless or shortly bladed sheaths, sometimes (like the lower primary bracts) herbaceous, flat, exactly linear, rather suddenly narrowed to the obtusish tip, scabrid on the margins and the main nerves in the upper part, pale green, 2—5 mm wide; sheaths narrow, triquetrous, wingless, sparsely pubescent; contraligule short, broadly rounded, ciliate. Inflorescence occupying by far the greater part of the stem, narrow, consisting of 3—5 very remote, dense partial panicles; terminal panicle 2—3 cm long, lateral ones somewhat smaller, usually binate at the nodes, more or less nodding, their peduncles much exerted from the sheaths, very long, filiform (but 2-winged at the dilated apex), smooth or scabrid, often purplish; primary bracts foliaceous, longer than the panicles in their axils, upper ones gradually shorter; secondary bracts setaceous, often curved. Spikelets shortly peduncled (peduncles 1—2 mm long), either male and female or male and bisexual; male spikelets linear-lanceolate, 3—4 mm long; stamens 2(—3); anthers linear, 1—1½ mm long, with shortly produced connective; nut-bearing spikelets 4½—5 mm long, unisexual or with some male flowers besides the female one; glumes ovate, acute or mucronulate, scabrid on the keel, pale ferrugineous with green keel. Cupula shallowly 3-lobed, c. 1 mm wide. Disk triangular, shallowly 3-lobed, appressed; lobes obtuse, with very narrow, reflexed margins, abruptly ending in a short, stiff, erect, subulate mucro, pale ferrugineous. Nut shorter than the glumes, elliptic-oblong, obscurely to obtusely trigonous, rugulose, somewhat tuberculate at the top, sparsely pubescent, apiculate, dull, white,  $2\frac{1}{3}-2\frac{1}{2}$  by  $1\frac{3}{4}-2$  mm.

**Distribution:** Australia (N. Territory, Queensland); in Malaysia: once collected in the Aru Islands.

**Ecology:** In moist places, in swampy ground, in open forests, often in *Melaleuca* stands, at low altitudes.

**MOLUCCAS.** Aru Islands. P. Trangan, Kp Batugojang, in *Melaleuca* savannah, few m: *Buwalda* 5555 (BO, L).

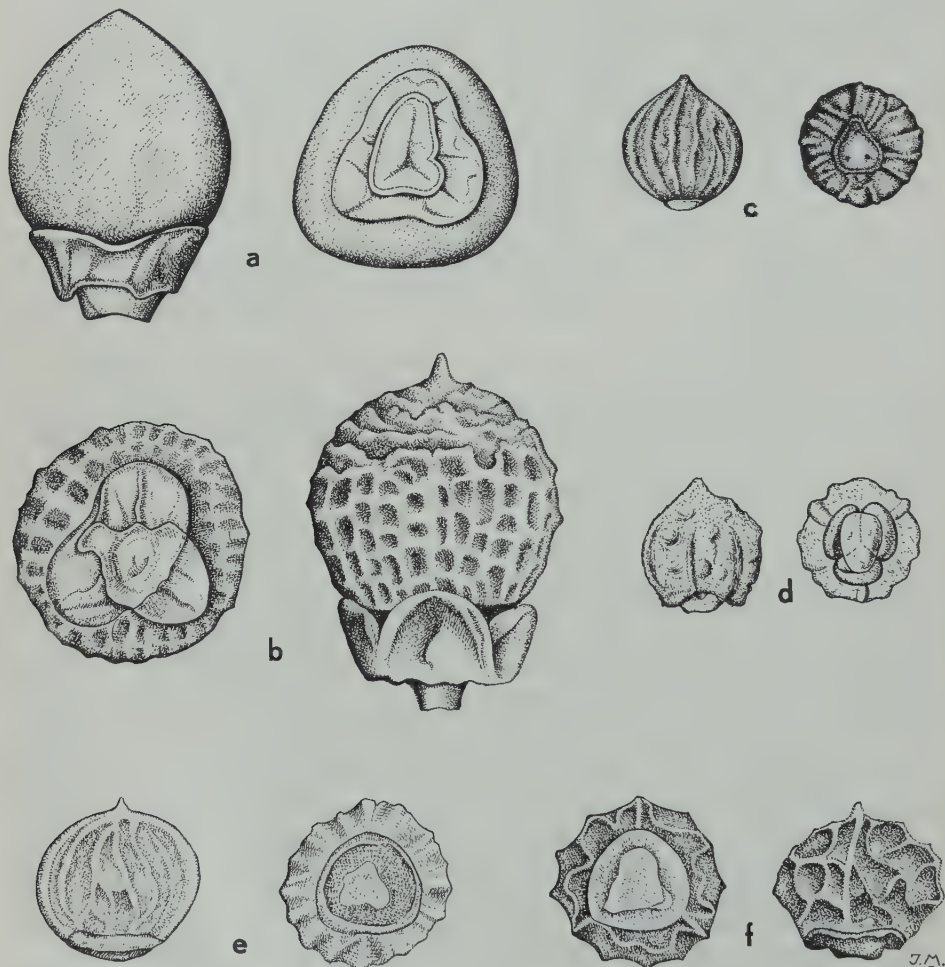


Fig. 8. Nuts and disks of: a. *Scleria thwaitesiana* Boeck.; b. *S. rugosa* R. Br.; c. *S. pygmaeopsis* Kern; d. *S. pygmaea* R. Br.; e. *S. caricina* (R. Br.) Benth.; f. *S. reticulata* (Holt.) Kern — All  $\times 20$ .

**Note.** Among Am. Dietrich's *Scleria* collections from Australia, which were worked up by Boeckeler, there are some specimens of *S. tricuspidata* (HBG, L), labelled "*Scleria novae-hollandiae*" or "*S. mackaviensis*", not in Boeckeler's handwriting. They do not answer Boeckeler's descriptions of these species, nor of any other he described.



29. *Scleria laxa* R. Br., Prodr. 1810, 240; Benth., Fl. Austr. 7, 1878, 428, p.p.; S. T. Blake, Proc. R. Soc. Queensl. 60, 1949, 52. [T.: Nova Hollandia: *R. Brown* 6068 (BM)]. — *S. zeylanica* (non Poir.) Clarke, Philip. J. Sc. 2, 1907, Bot. 104, p.p. (quoad *Loher* 808, p.p.). — *S. filipendula* S. T. Blake, Proc. R. Soc. Queensl. 58, 1947, 49. [T.: Queensland. *S. T. Blake* 5233]. — Fig. 7 k.

Annual with fibrous, dark red roots. *Stems* very slender, tufted, erect, more or less nodding at the top, triquetrous, glabrous and smooth, 1—2-noded below the inflorescence, 20—45 cm by 1—1½ mm. *Leaves* herbaceous, flat, narrowly linear, rather abruptly narrowed to the obtusish tip, glabrous, smooth or scabrid on the margins and the main nerves near the apex, pale green, 1—3 mm wide; sheaths narrow, triquetrous, wingless, upper ones glabrous, lower ones often reduced to the sheaths, pubescent, purplish; contraligule short, broadly rounded, ciliate. *Inflorescence* occupying by far the greater part of the stem, narrow, very loose, consisting of about 3 very remote fascicles of partial panicles, the terminal panicle not larger than the lateral ones, 1—2 cm long; peduncles 3—4 together at the nodes, exerted from the sheaths, more or less nodding, filiform, slightly incrassate at the apex, scabrid, 2—4 cm long; primary bracts similar to the leaves, erect, as long as or overtopping the inflorescence. *Spikelets* unisexual; male spikelets about as long as their peduncles, linear-lanceolate, 1½—2½ mm long; stamen 1; anther oblong-linear, ⅔—1 mm long, with shortly produced connective; female spikelets 3½—4 mm long, without a trace of a male part; glumes ovate, acute or mucronulate. Cupula very small, ⅔ mm wide, hardly lobed. *Disk* small, shortly 3-lobed; lobes obtuse, semi-orbicular. *Nut* globose, deeply longitudinally ribbed, with 3 of the ribs more prominent, more or less trabeculate between the ribs, slightly tuberculate at the top, umbonulate, glabrous, shining, white, c. 1⅔ mm across, the ribs not all reaching the base of the nut, but leaving a smooth triangular area above each disk-lobe.

*Distribution*: Queensland; in Malaysia: Luzon; to be expected in S. New Guinea, as it was collected on Thursday Island in Torres Strait.

PHILIPPINES. Luzon Central, Baloc-baloc: *Loher* 808 p.p. (P).

AUSTRALIA. Thursday Island: *Jaheri* s.n. (BO).

*Note*. Closely related to *Scleria thwaitesiana*, from which it can be distinguished by the weaker stems and leaves, the much longer, nodding peduncles of the lateral panicles, the number of panicles arising from each node (3—4 in *S. laxa*, 1—2 in *S. thwaitesiana*), and the strongly ribbed or scrobiculate, apiculate nut.

30. *Scleria thwaitesiana* Boeck., Linnaea 38, 1874, 454. [T.: Ceylon: *Thwaites* CP 3797 (BO, CGE, K, P)]. — *S. ceylanica* forma *b* Thwaites, En. Pl. Zeyl. 1864, 435. — *S. ceylanica* var. *angustifolia* Thwaites ex Boeck., Linnaea 38, 1874, 454, in syn. — *S. zeylanica* (non Poir.) Clarke, Fl. Br. Ind. 6, 1894, 687, p.p. (quoad *Thwaites* CP 3797); J. Linn. Soc., Bot. 34, 1898, 98, p.p.; Hook. f. in Trim., Handb. Fl. Ceyl. 5, 1900, 97, p.p. — Fig. 8 a.

Annual (?), with fibrous, dark red roots. *Stems* very slender, tufted, strictly erect, triquetrous, glabrous and smooth, 15—50 cm by 1—2 mm. *Leaves* rigid, canaliculate, narrowly linear, rather abruptly narrowed to the obtusish tip, glabrous, smooth or minutely scabrid at the top, green, 1—2(—3) mm wide;

sheaths narrow, triquetrous, wingless, glabrous, the lower ones reduced to the sheaths, purplish; contraligule very short, glabrous or minutely scabrid-ciliate. *Inflorescence* narrow, elongate, consisting of a terminal panicle 1—2 cm long, and 2—3 remote lateral fascicles; terminal panicle not pseudo-lateral, its bract not or but slightly overtopping the inflorescence; peduncles of lateral panicles single or binate at the nodes, setaceous, more or less exserted from the sheaths, smooth or slightly scabrid, often purplish; primary bracts similar to the leaves, erect, not overtopping the inflorescence. *Spikelets* unisexual; male spikelets about as long as their peduncles, linear-lanceolate, 2 mm long; stamen 1; anther oblong,  $\frac{2}{3}$  mm long, with shortly produced, bristly appendage of the connective; female spikelets 4 mm long; glumes ovate, acute or mucronulate. *Disk* thin, appressed, triangular with rounded angles, hardly lobed, not cellular-glandular. *Nut* shorter than the glumes, subglobose, obtusely trigonous, not or hardly apiculate, smooth or nearly so, very shining,  $1\frac{1}{3}$ — $1\frac{2}{3}$  mm across.

**Distribution:** Insufficiently known because of confusion with *Scleria rugosa*; Ceylon, Thailand; in Malaysia once collected in the Malay Peninsula, together with *Scleria neesii*.

**Ecology:** In wet localities, in open grassy ground, at low and medium altitudes, in Thailand up to 1300 m.

**MALAY PENINSULA.** Perlis. Bukit Ketri, at low alt.: *Henderson SF 22964 B* (SING).

**Note.** Clearly distinct from *Scleria rugosa* by the stiffly erect stems, the rigid, narrow leaves, the very short contraligule, the setaceous peduncles of the lateral panicles, the obtusely trigonous, muticous nut, and the hardly lobed disk, which is not cellular-glandular.

31. *Scleria rugosa* R. Br., Prodr. 1810, 240; Kunth, En. 2, 1837, 358; Steud., Syn. 2, 1855, 179; S. T. Blake, J. Arn. Arb. 35, 1954, 226. [T.: Endeavour River: *Banks & Solander* (BM)]. — *S. lateriflora* Boeck., Linnaea 38, 1874, 455; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 17; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 55. [T.: Ceylon: *Thwaites CP 3796* (BM, BO, CGE, P)]. — *S. onoei* Franch. & Savat., En. Pl. Jap. 2, 1879, 122 & 549; Ohwi, Mem. Coll. Sc. Kyoto Imp. Un. B 18, 1944, 9, incl. *var. pubigera*. [T.: Japan: *Ono* (P)]. — *S. flaccida* Clarke, Fl. Br. Ind. 6, 1894, 688, non Steud. (1855); J. Linn. Soc., Bot. 34, 1898, 98; Ill. Cyp. 1909, t. 127, f. 3—5. [T.: Assam: *Clarke 40744* (BM, K); *Kurz 2702* (K)]. — *S. zeylanica* (non Poir.) Clarke, Fl. Br. Ind. 6, 1894, 687, excl. syn. *S. thwaitesiana*; J. Linn. Soc., Bot. 34, 1898, 98; Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 227; Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 110; Clarke, Philip. J. Sc. 2, 1907, Bot. 104, p.p., excl. *Merrill 4617*; Merr., Fl. Manila 1912, 120; Camus, Fl. Gén. I-C. 7, 1912, 163; Merr., En. Born. 1921, 67; En. Philip. 1, 1923, 136; Ridl., Fl. Mal. Pen. 5, 1925, 177. — *S. pubigera* Makino, Bot. Mag. Tokyo 27, 1913, 55. [T.: Japan, several collections mentioned]. — *S. tokusanensis* Nakai, Bot. Mag. Tokyo 30, 1916, 274, fide Ohwi. [T.: Corea austr.: *Mori 34 bis* (n.v.)]. — *Fig. 8 b*.

Annual, with fibrous, dark red roots. *Stems* slender, tufted, obliquely erect or decumbent, triquetrous, smooth, (5—)10—30(—40) cm by  $\frac{1}{2}$ — $1\frac{1}{2}$  mm. *Leaves* herbaceous, weak, flat, rather abruptly narrowed to the obtusish tip, grass green or pale green, from glabrous to densely pubescent with pale, patent

hairs, smooth, 2—4 mm wide; sheaths loose, from sharply triquetrous to distinctly winged; contraligule short, semi-orbicular, ciliate. *Inflorescence* narrow, elongate, consisting of a terminal (but pseudolateral) panicle and 1—2 lateral, remote fascicles of panicles not markedly different from the terminal one; panicles single or binate at the nodes, on stout, triquetrous, winged, often recurved peduncles; primary bracts erect, similar to the leaves, the upper one as though continuing the stem, distinctly overtopping the inflorescence. *Spikelets* unisexual; male spikelets shortly peduncled, lanceolate, c. 2 mm long; stamen 1; anther oblong,  $\frac{1}{2}$ — $\frac{2}{3}$  mm long; appendage of the connective short, ovate, smooth or nearly so; female spikelets 3—4 mm long; glumes ovate, acute or mucronulate, usually long-ciliate on the keel, rarely glabrous; a sterile glume besides the female flower sometimes present. Cupula hardly lobed,  $\frac{2}{3}$  mm wide. *Disk* thick, appressed, shallowly 3-lobed, densely cellular-glandular; lobes obtuse, semi-orbicular. *Nut* shorter than the glumes, globose or slightly depressed, terete, apiculate, smooth or more less rugulose to lacunose especially in the upper half, often somewhat tuberculate at the top, shining, white or finally greyish,  $\frac{1}{3}$ — $\frac{1}{5}$  mm across.

**Distribution:** Widely distributed from Ceylon and India to S. China, Formosa, and Japan, N. and NE. Australia, New Caledonia; in Malaysia: Malay Peninsula, W. Java, Madura, Kangean, Borneo, Lesser Sunda Islands (Tanimbar), Philippines (Luzon), Moluccas (Ambon), and New Guinea (Papua).

**Ecology:** In open swampy places, savannahs, fallow rice-fields, on rice-field dikelets, damp road-sides, at low altitudes, up to 500 m.

**Vernacular names:** *Rumput panjang*, Mal., *ilat bogo*, *ilat lalab*, Sund.; Philip.: *dát-babáe*, *dát-parang*, *púgad-púgad*, Tag.

**MALAY PENINSULA.** Wellesley: *Agr. Off. Butterworth SF 37101* (SING). Kedah: *Spare 3773* (SING). Perak: *Berwick K 28* (SING); *Seimund s.n.* (SING); *Spare SF 36304* (BO, K, SING). Pahang: *Henderson SF 24446* (SING, NY); *Ridley s.n.* (SING). Selangor: *Monod de Froideville 577* (L). Malacca: *Ridley 1567* (SING). Johore: *Corner s.n.* (SING); *Henderson SF 38210* (K, SING); *Vesterdal 133* (C). Penang: *Curtis 1907* (K, SING); *Nauen s.n.* (SING). Singapore: *Corner s.n.* (SING); *Ridley s.n.* (SING); *Sinclair s.n.* (L).

**JAVA.** W. Java: *Bakhuizen van den Brink 6447* (BO, K, L, P, SING, U), 6484 (BO, L), 6496 (BO, L), 7434 (BO); *Bakhuizen van den Brink f. 3552* (U); *van Steenis 5280* (BO, L), 7495 (BO, L). Kangean: *Backer 30050* (BO). Madura: *Backer 20140* (BO), 20176 (BO). Karimundjawa: *Karta 369* (BO).

**LESSER SUNDA ISLANDS.** Tanimbar Is.: *Buwalda 4522* (BO, L).

**BORNEO:** *Barber 306* (K). Sarawak: *G. Hose s.n.* (SAR, SING). North Borneo: *Ramos 1130* (BO, L, P), 1775 (BO); *Wong Yun Liew E 25 A* (BM). South Borneo. Banjarmasin: *Motley 95* (K).

**PHILIPPINES.** Luzon: *Loher 808* (K, P, p.p.); *Merrill Phil. Pl. 525* (FI, U), 3665 (BM, BO, K, NY, P); *Ocfemia PNH 2251*; *Ramos Phil. Pl. 1451* (BM, BO, L, NY, P, SING), *BS 10905* (SING), *BS 21688* (K), *BS 22001* (BM, BO, L, NY, P, SING), *BS 27626* (P); *Robinson BS 9502*.

**MOLUCCAS.** Amboina: *Barclay s.n.* (BM); *Forsten s.n.* (L).

**NEW GUINEA.** Papua: *Brass 6013* (L), 7532 A (BM, BO, K, U). NE. New Guinea: *Himson 24* (L).

**Notes.** 1. A very variable species. The plants may be almost glabrous or softly pilose all over, the nuts smooth or tuberculate-rugose, the leaf-sheaths wingless or broadly winged, but I cannot find any correlation in these characters.

2. The way in which Clarke distinguished his *Scleria flaccida* from "*S. zey-*



*lanica*" is difficult to understand. In the latter he included *S. thwaitesiana*, in my opinion a markedly different species.

3. As was pointed out by S. T. Blake, l. c., *Scleria zeylanica* Poir. has nothing to do with the species described above, but is synonymous with *S. levis* Retz.

**Sect. VII. Sphaeropus** (Boeck.) Kern, stat. nov. — *Sphaeropus* Boeck., Flora 56, 1873, 89; Linnaea 38, 1874, 435 (type species: *Sphaeropus pygmaeus* Boeck.).

**32. Scleria pygmaeopsis** Kern, sp. nov. — Fig. 8c, 9.

**Typus:** Sumba: *De Voogd 2513* (BO; dupl. in L, SING).

Herba annua, pergracilis, glabra, radicibus fibrosis purpureis. *Culmi* solitarii vel fasciculati, filiformes, triquetri, laeves, simplices vel basin versus ramosi, 5—15 cm alti,  $\frac{1}{3}$ — $\frac{1}{2}$  mm crassi. *Folia* basalia pauca, herbacea, flaccida, plana, linearia, acutissima, 7-nervia, costa nervorumque lateralium utroque latere unico tantum elevatis, fere laevia (nonnisi apice marginibus subtilissime serrata), 3—5 cm longa,  $1\frac{1}{2}$ —2 mm lata, vaginis purpureis. *Inflorescentia* laxa, culmi partem majorem occupans, e corymbulis 3—8 axillaribus, haemisphaericis, 1—2 cm remotis, fasciculato-contractis, 3—5 mm latis, pedunculis brevibus haud vel vix e vagina bractee exsertis constructa. *Bractee* foliaceae, imae 3—5 cm longae, superiores gradatim breviores, vaginis brevibus peranguste alatis, antice truncatis vel emarginatis. *Spiculae masculae* pauci-(c. 3-)florae, 1— $1\frac{1}{2}$  mm longae, glumis membranaceis muticis; stamen 1, anthera parvula, oblonga,  $\frac{1}{3}$  mm longa. *Spiculae femineae* uniflorae,  $1\frac{1}{2}$ —2 mm longae, pedunculo apice globoso-inflato; glumae 2, suboppositae, oblique patulae (haud conniventes), oblongo-ovatae, acutae, apiculatae vel mucronulatae, tenuiter 3—5-nerviae, integrae, marginibus hyalinis inferne purpureis; stylus tenuis,  $\frac{1}{2}$  mm longus, stigmatibus tribus stylo aequilongis. *Nux* perminuta, globosa, basi truncata, apice brevissime acuminata, longitudinaliter costulata, costulis tribus prominentioribus, primo albida, demum fusca vel nigricans, nonnisi  $\frac{1}{2}$ — $\frac{3}{5}$  mm longa et lata, maturitate e glumis in rhachilla persistentibus prolapsa, disco obsoleto trigono albedo, cum fructu connato.

**MALAYSIA.** Lesser Sunda Islands. E. Sumba, Lea plain, in swamp, alt. 500 m, May 28, 1936: *de Voogd 2513* (BO, L, SING).

**Note.** Closely related to *Scleria pygmaea* R. Br., (Fig. 8d), from which it differs by the slenderer habit, the quite entire glumes, and especially by the somewhat smaller, etuberculate nut with obsolete triangular disk. In *Scleria pygmaea* the glumes are often slightly 3-lobed (side-lobes small, obtuse, more rarely absent), and the nut is about  $\frac{4}{5}$  mm long and wide, tuberculate, with 3 crescent-shaped swellings at the base which surround the disk.

**Sect. VIII. Diplacrum** (R. Br.) Kern, stat. nov. — *Diplacrum* R. Br., Prodr. Fl. Nov. Holl., 1810, 240 (type species: *Diplacrum caricinum* R. Br.).

**33. Scleria caricina** (R. Br.) Benth., Fl. Austr. 7, 1878, 426; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 17; Clarke, Fl. Br. Ind. 6, 1894, 688; J. Linn. Soc., Bot. 34, 1898, 98; Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 227; Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 111; J. Str. Br. R. As. Soc. no 59, 1911, 225; Fl. Mal. Pen. 5, 1925, 178; Kük., Bot. Jahrb. 69, 1938, 261. Based on *Diplacrum*

*caricinum* R. Br. — *Diplacrum caricinum* R. Br., Prodr. 1810, 241; Brongn. in Duperrey, Voy., Bot. 2, 1834, 160; Kunth, En. 2, 1837, 360; Endl., Iconogr. 1838, t. 25; Zoll., Syst. Verz. 1, 1854, 60; Steud., Syn. 2, 1855, 180; Miq., Fl. Ind. Bat. 3, 1856, 345; Sum., 1861, 262 & 602; Boeck., Linnaea 38, 1874,



Fig. 9. *Scleria pygmaeopsis* Kern — a. Habit,  $\times 1$ ; b. female spikelet,  $\times 15$ ; c. female and male spikelet,  $\times 15$ ; d. diagram of c; e. glume of female spikelet,  $\times 15$ ; f. pistil,  $\times 30$ ; g. stamen,  $\times 45$ ; h—i. nut,  $\times 45$ . — From *De Voogd 2513*.

434; Goebel, Ann. Jard. Bot. Btzg 7, 1888, 132, t. 15, f. 21—29; Hook. f. in Trim., Handb. Fl. Ceyl. 5, 1900, 101; Clarke, J. Linn. Soc., Bot. 36, 1903, 267; Philip. J. Sc. 2, 1907, Bot. 106; Ill. Cyp. 1909, t. 134, f. 3; Rendle, J. Bot. 39, 1910, 179; Camus, Fl. Gén. I.-C. 7, 1912, 157; Merr., En. Born. 1921, 67; En. Philip. 1, 1923, 136; Kük., Bot. Jahrb. 59, 1924, 9; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 53; S. T. Blake, J. Arn. Arb. 35, 1954, 233. [T.: Endeavour River: *Banks & Solander* (BM)]. — *Olyra malaccensis* Wall., Cat. 1831, 3540 A, B, nom. nud. — *Diplacrum tridentatum* Brongn. in Duperrey, Voy., Bot. 1834, t. 26. [T.: Ambon: *d'Urville* (P)]. — *Diplacrum zeylanicum* Nees in Wight, Contr. 1834, 119. [T.: Ceylon: *Macrae* (CGE)]. — *Diplacrum caricinum* var. *sumatranum* Miq., Sum. 1861, 602. [T.: Sumatra occ.: *Teysmann* (BO)]. — *Fig. 8 e.*

Very slender, nearly smooth and glabrous annual with fibrous reddish roots. *Stems* tufted, diffuse or procumbent, triquetrous, smooth, (2—)5—35 cm by  $\frac{1}{2}$ —1 mm. *Leaves* herbaceous, flat, linear, rather abruptly narrowed to the acute tip, grass green, glabrous, scaberulous on the margins in the upper part, 1—5 cm by (1½—)3—5 mm; sheaths triquetrous, not winged, widened upwards, truncate at the top (without contraligule). *Inflorescence* occupying by far the greater part of the stem, composed of several to numerous (up to c. 20) remote, small, dense, axillary clusters; primary bracts leaf-like; peduncles usually just exerted from their sheaths, somewhat winged; ultimate bracts glume-like, more or less winged on the back; terminal spikelet of each cluster female. Male *spikelets* small, 1—2 mm long, few-flowered; stamen 1, anther oblong, c.  $\frac{1}{3}$  mm long; female spikelets without a trace of male flowers, finally almost cylindric, 2—3 mm long; glumes 2, subopposite, ovate-lanceolate, several-nerved, 3-lobed, central lobe herbaceous, cellular-reticulate above, cuspidate, lateral lobes shorter, membranous. *Disk* obsolete, adnate, with a scarcely prominent 3-angled margin. *Nut* hidden by the connivent glumes and falling with them, depressed-globular to ovoid-globular, irregularly ribbed (the longitudinal ribs more pronounced than the transverse ones and 3 of them prominent), slightly hispid at the top, white, finally more or less discoloured,  $\frac{3}{4}$ —1 mm across.

*Distribution*: From Ceylon and India to S. China, Japan, Micronesia, and Queensland; almost throughout Malaysia, but everywhere scattered.

*Ecology*: In damp open places, on grassy sunny roadsides, river-banks, at low and medium altitudes, up to 1200 m; locally sometimes abundant.

*Vernacular name*: *Ilat*, Sund.

SUMATRA. West Coast: *Beccari* PS 875; *Meijer* 5727; *Teysmann* HB 1137. East Coast: *Hagerup* s.n.; *Lörzing* 9733, 12979.

MALAY PENINSULA. Perlis: *Henderson* SF 22965. Trengganu: *Vesterdal* 678. Pahang: *Burkill & Haniff* SF 17456; *Ridley* s.n.; *Sinclair* 8878. Johore: *Henderson* SF 38216; *Holttum* SF 38298; *Ridley* 11499, 15420; *Vesterdal* 132. Singapore: *Burkill* SF 705; *Meijer* 259; *Ridley* 53, 3806.

JAVA. W. Java: *Backer* 23868; *Bakhuizen van den Brink* 5182, 5417, 6485; *Korthals* s.n.; *van Steenis* 1767, 8184; *Zollinger* 1189. E. Java: *Coert* 1157; *Coert & Donk* 3562.

LESSER SUNDA ISLANDS. Tanimbar Islands: *Buwalda* 4528.

BORNEO: *Jaheri* 99. Sarawak: *Clemens* 21367; *Hose* 348; *Ridley* 11691, s.n. SE. Borneo: *Motley* 86. N. Borneo: *Clemens* 11164; *Ramos* 1560. Labuan: *van Steenis* 17868. NE. Borneo: *Meijer* 2409.

PHILIPPINES: *Loher* 7157. Luzon: *Loher* 736; *Merrill* 3626; *Ramos & Edaño* BS 33507; *Shaw* 44. Bohol: *Ramos* BS 43276. Panay: *Ramos & Edaño* BS 30954.



Guimaras: Sulit PNH 11817. Bucas Grande: Ramos & Pascasio BS 35034. Mindanao: Merrill 8236.

CELEBES. Central Celebes: Eyma 3382; Kjellberg 3752. SE. Celebes: Elbert 3085.

MOLUCCAS. Ambon: Rant 795; Robinson 1886; Zippelius s.n.

NEW GUINEA. W. New Guinea: van Royen 3601a; Schram BW 7955; van Zanten 1008. NE. New Guinea: Baim s.n.; Clemens 8323 A; Himson 43. Papua: Brass 7842. Misool: Pleyte 925.

Note. In this species and the next one the epidermal cells on the upper side of the glumes of the female spikelets are much inflated. Though less pronounced, such cells are also found in the species of *Scet. Sphaeropus* (*S. pygmaea*, *S. pygmaeopsis*, *S. africana*) and in *Scleria rugosa*.

34. *Scleria reticulata* (Holtt.) Kern, Reinw. 6, 1961, 71. — *Diplacrum reticulatum* Holtt., Gard. Bull. Sing. 11, 1947, 295, f. 6. [T.: Pahang: Henderson SF 11941 (SING; dupl. in BO, L)]. — Fig. 8f.

Closely related to *S. caricina* and very similar in habit to it. Female spikelets turbinate (not cylindric),  $1\frac{1}{2}$ —2 mm by  $1\frac{1}{4}$ — $1\frac{1}{2}$  mm; glumes ovate, acute, entire (not 3-lobed), purplish punctulate, with only the midnerve prominent, the sides faintly nerved. Nut depressed-globose, tuberculate-reticulate between the 3 longitudinal ribs,  $\frac{3}{4}$  by  $1$ — $1\frac{1}{4}$  mm.

Distribution: East Bengal (*Griffith, Kew Distrib. 6114*, K, P); Burma (Kyaukpyu Island: *E. G. Wallace 9148*, K, fide Holttum in litt.); Peninsular Thailand (Surat); in Malaysia: Malay Peninsula: Pahang.

Ecology: In the Malay Peninsula in damp spots in lalang (= *Imperata*) field.

PENINSULAR THAILAND. Surat. Ban Na: *Yuang 51* (BO, K).

MALAY PENINSULA. Pahang. Gua Tipus, Chegar Perah: *Henderson SF 11941* (BO, L, SING).

### Doubtful species

1. *Scleria approximata* Hassk., Tijds. Nat. Gesch. Phys. 10, 1843, 118; Cat. Bog. 1844, 22. "Late major Rumph. amb. VI p. 20, t. 8. 2. Ielat." — No description; in Ind. Kew. referred to the synonymy of *S. sumatrensis* Retz. Rumphius's figure represents a *Scleria* of the group with pseudo-whorled leaves, probably *S. scrobiculata* Nees or *S. polycarpa* Boeck.; cf. Merrill, Int. Rumph. 1917, 108.

2. *Scleria waigiouensis* Steud., Syn. 2, 1855, 173; Miq., Fl. Ind. Bat. 3, 1856, 345. [T.: in insula Waigiou: *d'Urville* (n.v.)].

According to Clarke (J. Linn. Soc., Bot. 36, 1903, 266; Philip. J. Sc. 2, 1907, Bot. 106) = *Scleria scrobiculata* Nees. I have not found Steudel's type specimen in his herbarium (preserved in P); a specimen of *S. scrobiculata* from Waigeo, Offak: *d'Urville 1* (P) may be an isotype of Steudel's species.

### Excluded species

*Scleria macrophylla* Presl, Rel. Haenk. 1, 1828, 200, t. 3, f. 25; Nees in Wight, Contr. 1834, 116; Kunth, En. 2, 1837, 356; Steud., Syn. 2, 1855, 170; Miq., Fl. Ind. Bat. 3, 1856, 343; F.-Vill., Nov. App. 1882, 310. [T.: "Habitat in insula Luzon"].

The type is certainly not from Luzon, but from tropical South America or Mexico. Clarke (Fl. Br. Ind. 6, 1894, 693) wrongly reduced it to *Scleria bancana* Miq. Cf. Merrill, En. Philip. 1, 1923, 136; H. Pfeiffer, Mitt. Inst. Allg. Bot. Hamb. 7, 1928, 175; Core, Brittonia 2, 1936, 38.

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## TWO NEW SPECIES OF *SCLERIA*

by

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(Queensland Herbarium, Brisbane)

(Issued 1. XII. 1961)

The two species of *Scleria* described below were studied while revising the Australian and Malaysian species of the genus. The study of the Malaysian species has been taken over by Mr. J. H. Kern and the opportunity has been offered to publish the descriptions here. I am grateful to Dr. C. G. G. J. van Steenis and to Mr. Kern for this opportunity.

### 1. *Scleria oblata* S. T. Blake, sp. n. —

Herba perennis metralis vel brevior; rhizoma lignosum horizontale. *Culmi* approximati, multinodes, acute triquetri faciebus fere plani,  $\pm$  striati ceterum laeves, glabri, 2—3 mm crassi, circum medium vaginis obtecti. *Folia* superiora distantia, intermedia subaeque approximantia, inferiora ad vaginas redacta; vaginae arctae haud alatae, majore parte vel omnino laeves etiam in angulis, superiore parte  $\pm$  pubescentes; ligulae multo breviores quam latae, usque 1 mm longae, margine scariosa usque ad 0.5 mm lata tandem marcescente breviter denseque pilosae; laminae saepe inflorescentiam superantes, ad apicem angustissimum longe attenuatae, usque ad 8 mm latae, fere planae vel partim recurvae, majore parte laeves apicem versus praecipue in margine carinaeque atque basim versus in margine minute scabridae, facie superiore prope basim  $\pm$  puberulae. *Inflorescentia* communis circa 15—25 cm longa, 3—5 cm lata. *Bractaeae* foliis similes saltem inferiores culmum superantes. *Paniculae* 3—6, singulae, erectae, contiguae vel inferiores  $\pm$  distantes, pyramidales, brunneae, e bractearum vaginis vix vel breviter exsertae, circa 3—6 cm longae summa ceteris paulum major; axis ramique glabri fere laeves hi patuli. Bracteolae inconspicuae setaceae, eae ramorum primariorum usque medium ramum adaequantur vel paulum superantes, ceterae spiculis breviores. *Spiculae* unisexuales fere semper geminatae; glumae  $\pm$  stramineae, dense tenuiterque atosanguineo-striolatae. *Spiculae masculae* pedicellatae, pedicello scabridulo quam spicula saepe longiore, ambitu anguste lanceolatae vel suboblongae, leviter recurvae, 3.5—4 mm longae; glumae ovatae, obtusae, superiores muticae, infimae  $\pm$  mucronatae, carina interdum etiam lateribus  $\pm$  scaberulae. *Spiculae femineae* sessiles vel breviter pedicellatae, 4—4.5 mm longae; glumae late vel latissime ovatae, acutae vel subacuminatae, apiculatae, minute ciliolatae. *Nux* glumis brevior, oblata, haud angulata, fere mutica, basi breviter truncata, glabra, laevis, nitida, cum disco 2.3—2.5 mm longa, 2.5—2.8 mm lata; discus pallidus tenuiter rubido-striolatus, fere ad basim 3-lobatus, nuce angustior, ejus lobi latissime ovati vel oblati, rotundati, appressi, tenuiores, lateribus reflexi, sinubus acutis. — *T y p u s*: *Elbert 3078* in BRI, L.



CEYLON. Colombo: *Macrae* (MEL); without definite locality: *Thwaites C.P. 2745* (MEL, BO).

THAILAND. Bangkok: *Kerr 6974* (SING).

BANGKA. Lobok Besar, 20 m, sandy soil: *Anta 438* (L).

RHIO ARCHIPELAGO. Pulau Batan: *Ridley 6112* (SING).

MALAYA. Perak: Batu Gajah: *Burkill & Haniff in S.F.N. 13387* (SING).  
 Trengganu, Bendi: *Rostado* (SING). Pahang, Kuala Pahang: *Ridley 1479* (SING); Kuala Taban: *Seimund 257 p.p.* (SING). Selangor, Kuala Lumpur: *Hume 7739 A* (SING). Malacca, Malacca: *Gaudichaud 92* (FI), *Griffith* (FI), *Hervey* (SING), ? *Ridley* (SING); Alor Gajah: *Ridley* (SING). Johore, Tanah Merah Road: *Ridley 1719* (SING); Kota Tinggi, Lombong, rice fields: *Corner* (SING). Penang, Penang Hill, 690 m: *Nauen* (SING); hill S. of Ginting Pass: *Burkill in S.F.N. 4615* (SING); Waterfall: *Curtis 22 p.p.* (SING). Singapore, Reservoir: *Holtum & Henderson* (SING); Changi: *Ridley 5809* (SING); Galang: *Ridley* (SING); P. Ubin: *Furtado in S.F.N. 18630* (SING, BO).

JAVA. West Java, Tjikoja, ad vias et in sylvis aridis: *Zollinger 469* (FI, L); near Djakarta, 0 m: *Kern 8423* (L); Res. Bantam: *van Hasselt* (L); Bogor, grassy ruderal areas, stream bank: *de Wit 4210* (L). Central Java, Magelang: *Blume* (L). Pulau Panaitan, N of Mt. Parat: *van Borssum Waalkes 636* (L).

PHILIPPINE ISLANDS. Palawan, Taytay: *Bur. Sci. 9244 Merrill* (BO, L, SING); Mindanao, Bukidnon, Malaybalay, 570 m: *Santos 5991* (L). Sulu Prov., Turtle Is., upper slope on hill, 56 m: *Santos 4740* (L).

BORNEO. East Borneo, Maloewi, along the shore, 3 m: *Aët 183* (L, BO). North Borneo: Sandakan and vicinity: *Ramos 1709* (L). Labuan I., Port Victoria, shadow of trees, clayey soil, roadside: *van Royen 2890* (L).

CELEBES. S. E. Celebes, Rumbia, Wambakowu, monsoon forest: *Elbert 3078* (BRI, L).

Specimens of this species have been referred to *S. levis* Retz. by most authors, but *S. levis* is the correct name for the very different species widely known as *S. hebecarpa* Nees as I have pointed out in J. Arnold Arb. 35: 226—7. 1954. I also stated that the "name *S. levis* (the epithet of which is often spelled *laevis*) has been commonly applied to specimens of *S. terrestris* (L.) Fasset on which the fruits are somewhat depressed due to imperfect development." At first sight *S. oblata* resembles such specimens of *S. terrestris*, but the bracteoles are inconspicuous, the male spikelets  $\pm$  recurved, the ligule is shorter and densely hairy on the margins, the peduncles are very short and the disc is more deeply divided with acute sinuses; the short, oblate, shining mature nut is quite distinctive and the smooth culms and nearly smooth leaves are noteworthy. *Burkill & Haniff in S.F.N. 1314* and *Ridley's* specimens from Galang have more prominent bracteoles than the other specimens, especially in the topmost panicles.

## 2. *Scleria tricuspidata* S. T. Blake, sp. n. —

Herba annua viridis  $\pm$  scaberula plerumque 10—30 cm alta. Culmi fasciculati, triquetri,  $\pm$  scaberuli vel marginibus etiam parce scabri vel fere laeves, faciebus rigide pubescentes vel glabri, sub inflorescentia enodes vel uninodes. Folia basalia et caulinea saepius fere vel omnino ad vaginas redacta; vaginae triquetrae, marginibus costiformibus minute scaberulis haud alatae, faciebus  $\pm$  scabro-pubescentes; ligulae breviores quam latae, rotundatae,  $\pm$  1 mm longae, margine hirsutae; laminae, ubi adsunt, lineares in apicem angustum rotundatum attenuatae, sursum marginibus carinaeque scabrae alibi scaberulae vel laeves, 2—3.3 mm latae, culmum interdum superantes. Inflorescentia communis sparsa circa 3-nodis e paniculis 3—5 composita. Bractee

inferiores folio evoluto simillimae. *Paniculae* singulae vel binae ad nodos distantes ortae, inferiores longissime pedunculatae, oligostachyae, densae, summa ceteris major valde remota; pedunculi graciles, admodum nutantes, scabridi, inferne compressi et ancipites sursum triquetri bialati. *Spiculae* unisexuales, singulae sed arcte approximatae, pedicellatae; glumae pallidae tenuiter ferrugineo-striatae carina virides, extus glabrae. *Spiculae masculae* paucae, saepius paniculam terminantes, pedicello 1—2 mm longo praeditae, oblongo-lineares 3—4 mm longae. *Spiculae femineae* saepe brevius pedicellatae, 4.5—5 mm longae; glumae anguste ovatae, acutae, carina sursum  $\pm$  scaberula  $\pm$  excurrente. *Nux* gluma brevior, alba, opaca, fere oblonga (admodum ellipsoidea vel admodum ovoidea), acuminato-apiculata, prope basim abrupte constricta, obtuse trigona, reticulato-rugosa atque  $\pm$  verrucosa, parce pubescens, cum disco 2.5—2.75 mm longa, 1.7—1.8 mm lata. Discus arcte appressus basi productus, a basi visus fere triangularis obscure trilobatus, nuce paulo angustior, margine  $\pm$  incrassatus, lobis  $\pm$  obtusis mucronatis mucrone erecto subulato 0.2 mm longo. — *Typus*: Blake 5291 in BRI (holotypus), K, L, MEL.

MOLUCCAS. Aru Is., P. Trangan: *Buwalda* 5555 (BO, L.).

AUSTRALIA. Northern Territory. Gove (12° 15'S., 136° 43'E.) in *Melaleuca leucadendron* stand: *Specht* 957 (BRI); Port Bradshaw (12° 27'S., 136° 42'E.) at edge of *Melaleuca leucadendron* swamp: *Specht* 783 (BRI); South Bay, Bickerton I., in the Gulf of Carpentaria, in moist *Melaleuca leucadendron* stand: *Specht* 559 (BRI). — Queensland. Cook District, Cairns, in wet sandy forest land about sea level: *Blake* 9379 (BRI). North Kennedy District, Rockingham Bay, in moist places: *Dallachy* (MEL, BRI). Moreton District, Coolool on wet swampy ground: *Blake* 13760 (BRI); Alexandra Headland, swampy cliffside: *Blake* 5190 A (BRI); base of Buderim Mtn, marshy ground: *Blake* 5208 (BRI); Geebung, Brisbane, hillsides in open forest: *Blake* 5086 (BRI), and in damp places: *Blake* 5309 (BRI); Chermerside — Aspley, Brisbane, damp places: *Blake* 5126 (BRI); Moggill, Brisbane, damp hillside in open forest: *Blake* 5291 (BRI); The Gap, Brisbane, 60 m, damp grassy places: *Blake* 18739 (BRI); Samsonvale near Brisbane, 37 m, damp grassy place in open forest: *Blake* 15498 (BRI); Sunnybank, damp places: *Blake* 5299 (BRI); near Brisbane (?), in swamps: *F. M. Bailey* 32 (BRI, MEL).

Individuals of this species are slender, small, scabrous, annual plants found growing in damp places often associated in Australia with *Scleria novae-hollandiae* Boeck. and *S. rugosa* R. Br. which have a somewhat similar habit. The outstanding characters are: culms nodeless or with one node below the lowermost panicle; long, leaf-like bracts; widely spaced, solitary or binate, very small panicles on long, very slender peduncles; unpaired, pedicellate, mostly female spikelets; pallid glumes with green keels; dull, nearly oblong nut shorter than the glumes; and small, closely appressed disc nearly deltoid in outline as seen from below, with the lobes ending abruptly in short, erect, subulate points. Its closest ally is *S. novae-hollandiae* Boeck. which is smooth or nearly so with sessile or subsessile male spikelets, shallowly scrobiculate nuts and short, thin, broadly rounded, mucous lobes of the disc.

In Proc. Roy. Soc. Qd. 58: 50. 1947, I had identified this taxon with *S. benthamii* C. B. Clarke, Kew Bull. Add. Ser: 8: 58. 1908, but *S. benthamii* is a different species as stated op. cit. 60: 53. 1949. I had assumed that an unnumbered *Bailey* specimen at Brisbane was part of the type collection since it agreed with Clarke's description. Clarke cited "Brisbane River, *F. Mueller*, n. 61", but *Mueller* did not number his specimens; *F. M. Bailey* however,

sent many numbered specimens to Mueller some of which have been cited as having been collected by Mueller. However, the sheet at Melbourne numbered 61 from which the specimen at Kew would have been taken by Bentham (see Fl. Austr. 1: pref. 12\*. 1863) has a specimen of a different species. This specimen is scanty, but is sufficient to show that the species has stems with 2 or perhaps 3 nodes below the lowermost panicle, denser and rather larger panicles on shorter, stouter, erect peduncles with spikelets more equally distributed, male and female spikelets nearly equal in length and mostly in pairs or the upper ones of a branch without accompanying females, broader and more obtuse female glumes, glossy, larger, more ovoid nut about as long as the glumes with more regular reticulations and a thicker disc with definitely recurved margins; I have seen no other specimen to match it.

Bentham referred the type of *S. benthamii* to *S. tessellata* Willd. and on a single collection (Rockingham Bay: *Dallachy*) of *S. tricuspidata* he based *S. tessellata* Willd. var. *debilis* Benth. Fl. Austr. 7: 430. 1878 which is not *S. debilis* Wright. This epithet is therefore not available and *S. tricuspidata* has been described independently with a more copious collection as the type of the name. *S. tessellata* resembles *S. tricuspidata* in habit but is stouter, with 2 nodes below the inflorescence, longer male spikelets about as long as the female, slightly broader nut more evenly tessellated, and a deeply lobed disc with oblong or  $\pm$  obovate,  $\pm$  acuminate lobes with deep  $\pm$  V or U-shaped sinuses.<sup>1)</sup>

*S. laxa* R. Br. var. *pseudotessellata* Domin, Biblioth. Bot. 85: 489. 1915 is probably another synonym.

Bentham loc. cit. 428 supposed that *S. novae-hollandiae* was the same as *S. laxa* R. Br. Domin, following Clarke's arrangement of specimens at Kew, treated the two names as synonymous, but they belong to quite distinct species. In the original description in Flora 58: 120—1. 1875, Boeckeler quoted "Herb. Luerssen. Port Mackay. Nov. Holland. (Am. D.)". In 1937 I had on loan from Berlin a sheet with a TYPE label carrying the upper part of two culms, a packet marked "Herb. O. Boeckeler. Nova Holland. Port Mackay. Am. Dietrich coll. nr 725", and a label reading "*Scleria Novae Hollandiae* Böklr in Hb Luerssen". This sheet was presumably destroyed in 1943.

Boeckeler described complete plants, so it seems likely that the holotype should have been in Hb. Luerssen (HBG) and that the Berlin sheet was really a clastotype. There is an excellent sheet of *Dietrich* 725 at Melbourne agreeing fully with the description and marked as determined by Boeckeler, and this should be the neotype if no holotype can be found at Hamburg. Domin cited *Dietrich* 2443 *p.p.* as the type, indicating that it was mixed with material of *S. brownii* Kunth, a species with which Boeckeler's description does not agree. There is some evidence that some of Dietrich's collection numbers were altered later and this may have occurred in this case with some admixture of material.

*S. novae-hollandiae* is widely distributed northward from Brisbane through the coastal and subcoastal parts of northern and north-eastern Australia to southern New Guinea, and is also in Guam and Luzon. *S. merrillii* Palla,

<sup>1)</sup> This is apparently not *Scleria tessellata* Willd., but probably *S. mikawana* Makino. See my paper, this issue p. 200. — J. H. KERN.



Allgem. Bot. Zeitschr. 17: Beil. 8. 1911 is a synonym as I pointed out in J. Arnold Arb. 35: 225 (1954); I have seen two isotypes (*Merrill in Kneucker, Cyp. (excl. Carices) & Junc. exsicc. ix Lief. 249: BRI, L*).

*S. laxa* R. Br. Prodr. 240. 1810 appears to be a rare species of which I have seen a few collections from Thursday Island (*Jaheri, BO*) westward to the Northern Territory and southward along the Queensland coast to lat. 26° 30'S. The type (BM), of which there is a photograph and fragment at Brisbane, has a label with "*Scleria laxa* North Coast" in Brown's writing; there is no further indication of locality in his manuscript, but these annual species flower and fruit chiefly during the summer when Brown was in the Gulf of Carpentaria. The sheet also bears the distribution number 6068.

*S. filipendula* S. T. Blake, Proc. Roy. Soc. Qd. 58: 49. 1947 is a synonym, the type of which, *Blake 5233 (BRI)* is from the southern limit of its range.

Like *S. novae-hollandiae* and *S. tricuspidata*, *S. laxa* comprises slender, annual, tufted plants with up to 2 nodes beneath the lowermost panicle, small panicles on long slender peduncles, unisexual mostly unpaired spikelets, few small male spikelets, and nuts shorter than the glumes. *S. laxa* differs from both in that the terminal panicle is scarcely, if at all, larger than the others, the nut is globular and deeply tessellate even at maturity, and the disc is more deeply lobed and much thicker, especially at the sinuses.

# A NEW SPECIES OF ERIOCAULON FROM SUMATRA

by

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(Rijksherbarium, Leiden)

(Issued 1. XII. 1961)

## *E. pachystroma* van Royen, n. sp. — Fig. 1.

Herba valde caespitosa. Folia linearia, interdum falcata, 0.8—4 × 0.2—0.5 cm, vel basi interdum subabrupte usque ad 1 cm dilatata, glabra, axillis pilis longis albis munita. Pedunculi 0.5—4 cm longi, 5—8-costulati. Bractee involucranes oblongae vel ovato-oblongae, pallide luteae, glabrae; bractee florales conchatae, late ovatae, panduratae vel oblongo-obovatae, nigrescentes sed interdum basi pallide lutei, extus parte apicali albo-pilosa. Receptaculum longe pilosum. Flos ♂: sepala 3, interdum 2, connata, basi excepta nigrescentia, parte apicale albo-pilosa; petala 3, connata, glandulosa, extus apice et intus omnino albo- vel luteo-pilosa. Flos ♀: sepala 3, libera, naviculata, nigra, extus parte apicali albo- vel luteo-pilosa; petala 3, inaequalia, extus glabra, intus omnino albo-pilosa, glandulosa; ovarium 3-loculare. Typus: *van Steenis 9691* in L.

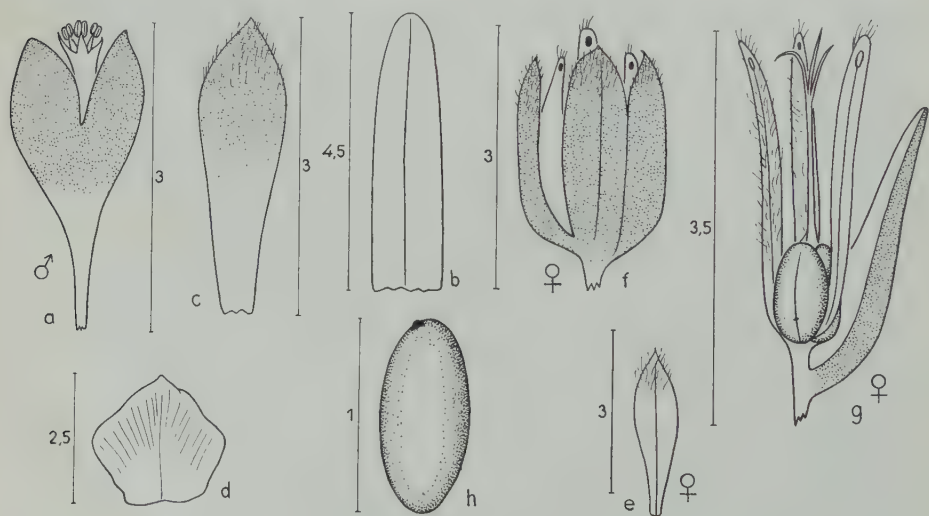


Fig. 1. *Eriocaulon pachystroma* van Royen — a. male flower; b. involucral bract; c and d. floral bracts; e. sepal of female flower; f. female flower; g. female flower, 2 sepals removed to show the petals and the ovary; h. seed (a-c and e-h from *van Steenis 9691*, d. from *van Steenis 8594*).

Herbs forming dense semi-globose pin-cushions or cushion-rings of great extent, up to 5 cm high. *Leaves* linear, sometimes falcate, 0.8—4 by 0.2—0.5 cm, at base sometimes subabruptly broadened to 1 cm, acute, 6—10-nerved, fenestrate, glabrous except for long white hairs in the axils. *Peduncles*

(0.5—)1—2.5(—4) cm long, 5—8-ribbed, glabrous, sheath 0.8—2(—2.5) cm long, at base with long white hairs. *Heads* obovoid to semi-globose, 2—5 by 2—7 mm, involucre bracts oblong or ovate-oblong, 3.5—4.5 by 1—2 mm, obtuse, 1-nerved, glabrous, pale yellowish, floral bracts concave, broadly ovate to oblong-obovate, 2.5—3.5 by 1—1.5 mm, cuspidate, sometimes scarious along apical part of margin, blackish at least for  $\frac{3}{4}$ , with white hairs on outside in apical part, otherwise glabrous; receptacle with long white hairs. ♂ *Flowers*: sepals 3, very rarely 2, tubuliformly connate but the two lateral ones connate at base only, boat-shaped, 2.5—3 by about 1 mm, obtuse, with white hairs on outside of apical part, blackish for at least  $\frac{3}{4}$ ; petals 3, tubuliformly united, very unequal in length, the free lobes oblong, the median one about 1 mm long, the lateral ones about 0.5 mm long, with white hairs along margin and on inside, with an ovoid, black gland on inside; stamens 6, anthers black. ♀ *Flowers*: sepals 3, free, boat-shaped, 2.5—3.5 by about 1 mm, cuspidate, black, with white hairs on outside of apical part; petals 3, unequal, oblanceolate, the median one longer than the lateral ones, 2.5—3.5 by about 0.5 mm, obtuse, with white or yellowish hairs on inside, with an ovoid, black gland on inside; ovary deeply 3-lobed, about 1 by 1 mm; style about 1.5 mm long, the three filiform branches moreover about 1.5 mm long. Seeds ellipsoid, dark brown, glabrous.

Type specimen: *van Steenis* 9691 in L.

Distribution: Sumatra.

Ecology. Growing on wet slopes or on poor peaty places, small hollows with thin covering of quartz sand, or on stony peaty ridges, at high altitudes, 2950—3400 m, Febr.

Remark. This species closely resembles *E. pulvinatum* van Royen described from New Guinea by the dense cushions, but differs by the unequal petals in both types of flowers, by the oblong or ovate-oblong involucre bracts and by the pubescence of the floral bracts.

SUMATRA. Gajo & Alas Lands, Mt Kemiri, alt. 3000 m: *van Steenis* 9691 (L), March, dense cushions on slope together with *Centrolepis*, *Oreobolus*, *Monostachya* and *Scirpus subcapitatus*; Mt Kemiri, E. slope, 3250 m alt., rocky summit, forming cushions-rings: *van Steenis* 9661 (L), fl. fr March; Mt Goh Lembuh, near the summit on poor peaty places, often in small hollows with thin covering of quartz sand, alt. 2950 m: *van Steenis* 9045 (L), fl. & fr. Febr.; Mt Losir, Central Peak, alt. 3400 m, stony peaty ridge, forms marked semi-globular cushions and in old specimens the central part decays so that "fairy rings" are formed: *van Steenis* 8594 (L), fl. Febr.



# A MISREPRESENTATION THROUGH A MISLEADING DIAGNOSIS IN WINBERG'S FLORULA JAVANICA

by

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(Issued 1. XII. 1961)

*Spiranthes sinensis* (Pers.) Ames, also known under the synonym *S. australis* (R. Br.) Lindl., is a terrestrial orchid widely spread in Asia, which is rather well known in Western Europe, because it has repeatedly been found growing spontaneously in pots in orchidhouses.

In Blumea 6(2): 361 (1950) the plant described as *Ophrys lancea* Thunb. ex Sw. was considered to be identical with the first and it was thought that the recombination *Spiranthes lancea* (Thunb. ex Sw.) B. B. S. was necessary. The reasons given for this transfer were:

(1) the short diagnosis of *Ophrys lancea* given by Winberg in Florula Javanica, p. 8 (1825);

(2) the original diagnosis of *O. lancea* in Swartz's well-known dissertation on the classification of orchids in Kongl. Vet. Akad. Handl. Stockh. 21: 223 (1800);

(3) the presence of the apparent holotype in the Thunberg herbarium (Uppsala).

Since a certain phrase in the diagnosis of *O. lancea* in Florula Jav. l. c. made me feel doubtful about the correctness of the identification, all points were verified. It appears that the plant under discussion not only differs specifically from the above-mentioned species of *Spiranthes*, but even belongs to a different tribe.

Ad (1) The relevant diagnosis in Flor. Jav. l. c., reads: "*Ophrys lancea*: Labium trifidum. Folia radicalia & caulina lineari-lanceolata, glabra. Spica spiralis, palmaris". The indication "labium trifidum" is not characteristic of a *Spiranthes*, at best it could be "labium obsolete trilobum", but at any rate it cannot apply to *Spiranthes sinensis*.

Ad (2) A perusal of the data regarding *Ophrys lancea* in Swartz's original diagnosis does not provide any indication pointing to a *Spiranthes*. In Swartz's paper (l. c., p. 202—254 and the legend opposite p. 138) the *Orchidaceae* were subdivided on account of the morphology of the anther into a number of large genera which later became the tribes *Ophrydeae*, *Neottieae*, etc.

The group of orchids referred by Swartz to the genus *Ophrys*, which included *O. lancea* Thunb., consists exclusively of unspurred *Ophrydeae*, such as e. g. *Herminium monorchis* (L.) R. Br., *Chamaeorchis alpina* (L.) L. C. Rich., *Aceras anthropophora* (L.) R. Br. and *Ophrys myodes* L. There is no reason to doubt that *O. lancea* also belongs to the group of ecalcarate *Ophrydeae*.

If there had been any doubt, Swartz would certainly have placed this species among the "dubiae" appearing on the same page. Moreover, (l. c., p. 226) he referred all species of *Spiranthes* known to him, to the genus *Neottia*, a part of the later *Neottieae*.

Although the arrangement of *O. lancea* under this particular group of the *Ophrydeae* alone is sufficient to establish its place in the system, Swartz's diagnosis provides additional and consistent information. Regarding *O. lancea*, belonging to the unspurred *Ophrydeae*, the indication "e Java" is already very significant, because in Java there is only a single representative of the ecalcarate *Ophrydeae* that comes into consideration, viz. the species hitherto known as *Herminium angustifolium* (Lindl.) Benth. The only alternative, *Sylvorchis colorata* J. J. S. in Bull. Dept. Agric. Ind. Néerl. 13: 2-7, t. 1 (1907) is a very rare endemic saprophyte and it is most unlikely that this plant was ever collected during Thunberg's fleeting visit to the island.

If one compares the description of the lip in Swartz's concise diagnosis of *Ophrys lancea* with the lip of the *Herminium* species, there can be but very little doubt that Swartz described this *Herminium*. Swartz's description reads "labello sublineari deflexo trifido, medio obsolete". The corresponding description of *Aceras angustifolia* Lindl. Bot. Reg. sub t. 1525 (1832), the basionym of *H. angustifolium* reads: "labello pendulo lineari . . . apice trifido: lacinia intermedia brevior" and here again is good agreement (fig. 1a).

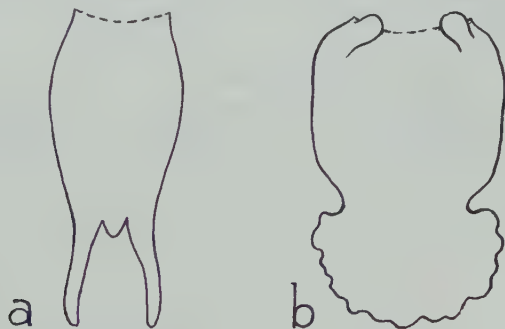


Fig. 1. a. Lip of *Herminium lanceum*. — b. Lip of *Spiranthes sinensis*.

The original description of the lip of *Neottia australis* R. Br., Prodr. 319 (1810), the basionym of *Spiranthes australis*, reads: "labello indiviso oblongo crispato" and this species obviously need not be considered (fig. 1b).

Ad (3) Through the courtesy of Prof. Dr. J. A. Nannfeldt to whom I am much indebted for his generous assistance, I could study the specimen of *Ophrys lancea* preserved in Thunberg's herbarium, which must be the specimen studied by Swartz and undoubtedly represents the holotype. It is indeed identical with *Herminium angustifolium*.

As regards the misleading phrase "Spica spiralis", used by Winberg in his description in Flor. Jav. and suggestive of a species of *Spiranthes*, this term was applied by Winberg in a general sense to denote the helical arrangement of the flowers in the inflorescence (which applies to practically all

terrestrial orchids) and not to describe a helical twist of the axis of the spike so characteristic of the genus *Spiranthes*.

As regards the correct synonymy, it is incomprehensible to me why *Ophrys lancea* Thunb. ex Swartz was omitted (overlooked?) in Lindley's Gen. & Spec. Orch. (1830—1840), although this species is mentioned in Willdenow's edition of Spec. Pl. 4, pars 1: 64 (1805) as *Ophrys lancea* Thunb. and by Persoon in his Syn. 2: 507 (1807) as a species of *Satyrium* (sect. *Aceras*!), and both works as well as Swartz's own dissertation are repeatedly cited by Lindley under other species.

*Ophrys lancea* is obviously the oldest name and a new combination under *Herminium* is required:

***Herminium lanceum*** (Thunb. ex Sw.) J. Vuijk, comb. nov.

*Ophrys lancea* Thunb. ex Sw. Kongl. Vet. Akad. Handl. Stockh. 21: 223 (1800); Willd., Sp. Pl. 4, 1: 64 (1805);

*Satyrium lanceum* (Thunb. ex Sw.) Pers. Syn. 2: 507 (1807);

*Aceras angustifolia* Lindl. Bot. Reg. sub t. 1525 (1832);

*Herminium angustifolium* (Lindl.) Benth. ex Hook. f., Fl. Br. Ind. 6: 129 (1894).

*Spiranthes lancea* (Thunb. ex Sw.) B. B. S., Blumea 6(2): 361 (1950), quoad comb. tantum, exclus. synonym., non *Spiranthes sinensis* (Pers.) Ames.

The binomial *Spiranthes lancea* thus nomenclaturally becoming a synonym of *Herminium lanceum*, the valid name to be used for the *Spiranthes* species erroneously identified with *Ophrys lancea*, remains *Spiranthes sinensis* (Pers.) Ames.

Finally I am greatly indebted to Prof. Dr. A. D. J. Meeuse, Director of the Hugo de Vries Laboratory at Amsterdam, for his revision of the English text and valuable help, and to Dr. P. Vermeulen for his helpful criticism.



## REVIEWS

**E. H. WALKER, A Bibliography of Eastern Asiatic Botany — Supplement 1.** Sponsored by the National Science Foundation, Washington, D. C., U. S. A. Published by the American Institute of Biological Sciences, Washington, D. C., U. S. A. 1960. xxxviii + 430 pages + subject index, 2 maps. Size 22 × 29 cm, double column, buckram cover. Price \$ 18.50 to individuals and industrial libraries, \$ 16.50 to A. I. B. S. members and all other libraries.

The publication of the supplement 1 of the well known and essential reference work of "A Bibliography of Eastern Asiatic Botany" is very welcome. It is a continuation of the original work, which closed with 1936, and extends through 1958. It covers the botanical literature on eastern Asia, as indicated by the title, which comprises China, Japan, Korea, Ryukyu, Mongolia and Soviet eastern Asia, as well as the major published papers appertaining to adjacent areas. It has been prepared on essentially the same pattern as the original volume while the subject index has been treated perhaps in a more thorough manner.

The volume contains over 11,000 extensively and carefully annotated entries occupying 414 pages. The work is in English but the titles, papers and author names in oriental characters are fully cited, which is an improvement as compared with the original volume. It includes now the original Chinese, Japanese and Korean titles and author names as published in oriental characters as well as translations or transliterations of them. In addition, the supplement fortunately covers the extensive Russian literature, nearly 1600 entries, on Soviet eastern Asia. All Russian titles are transliterated into Roman letters and are also translated. All these improvements make this bibliography more complete than the original volume and extend its usefulness.

The term botany has been broadly interpreted in order to cover most publications dealing with the plants of this area and make it available not only to botanists in different fields but also to pharmacologists, anthropologists, ethnologists, and librarians as well. This policy has been emphasized and reflected by the entries of the supplement. I have read it with pleasure and interest and paid special attention to the Chinese entries.

As one scans this volume, one is impressed by the quantity and details of the entries, the admirable format and printing, and the excellent binding. Dr Walker has done his best to attain a high degree of completeness so far as the articles written by the authors of eastern Asia are concerned and he should be congratulated for what he has accomplished.

In a comprehensive work like this and with the great difficulties encountered in its preparation, one should and must allow for some omissions and printing errors. I am glad to say that through the author's care, the number of printing errors is at a minimum as far as I can see in the Chinese entries. Here I may just mention one of them, which occurs on the title page; according to the Chinese characters of the title, the transliteration of "supplement" should be "Tscheng pu" instead of "Pu i".

In regard to the omissions, except the difficult-to-obtain publications, for example, some Chinese botanical literature, those appeared in some less promising serials, and those incidentally missed, there are some major works, important monographs and revisions published under general titles or under the titles of special geographical areas which are not included in this bibliography although they include important information concerning eastern Asiatic botany. Some examples are: C. Linnaeus: *Species Plantarum*. Vol. 1. A facsimile of the first edition, 1753, with an extensive historical and bibliographical introduction (xiv + 176 pp.) by W. T. Stearn; A. C. Smith: *The American species of Hippocrateaceae* (*Brittonia* 3, 1940, 341—555, fig. 1—12, & literature); and K. U. Kramer: *A revision of the genus Lindsaea in the New World* (*Acta Bot. Neerl.* 6, 1957, 97—290, 82 fig., & references).

In the introduction of the original volume (p. v), the authors have stated: "The objective has been to record those papers to which botanists who are concerned with the study of the plants of this area must or should refer". In the light of this principle I was surprised to miss the *Flora Malesiana* among the entries, except for the "Dates

of publication" by M. J. van Steenis-Kruseman and W. T. Stearn. Neither the Flora itself nor any revision of the families published in it has received an entry. As the authors of the bibliography have expressed clearly and rightly also in the introduction of the original volume (p. viii) that "The primary use of the bibliography is to aid students and investigators dealing with eastern Asiatic plants to discover what has been written on their special subjects, and to direct them to such works", the omission of an important work, as for example, the Flora Malesiana, seems unwarranted and would give the students of eastern Asiatic botany a quite incomplete information about the literature of some special groups.

I may quote another statement made by the authors in the introduction of the original volume (p. v) that "Special attention has been given to bibliographies, because of their value in indicating other data accessory to those made directly available here". With respect to this it may be pointed out that if the selected, concise and useful bibliographies published in the Flora Malesiana and Flora Malesiana Bulletin had been consulted, many omissions could have been avoided. Unfortunately, none of these bibliographies has received an entry in the supplement.

In conclusion, it is sincerely hoped that Dr Walker with his indefatigable spirit, great experience and detailed knowledge of the bibliography of eastern Asiatic botany will envisage to continue his bibliographical work on the flora of eastern Asia for the compilation of future supplements.

DING HOU.

**H. H. ALLAN**, *Flora of New Zealand*, Vol. 1, Indigenous Tracheophyta: Psilopsida, Lycopsidea, Filicopsida, Gymnospermae, Dicotyledones, 8°, 1085 pp., 40 fig., 4 maps, April 1961. — Govt. Printing Office, Wellington, New Zealand. Clothbound £ 5.5.—.

This new flora is a posthumous work seen through the press by Miss Lucy B. Moore, who was associated with the late author in this major botanical work; the typescript of this work was obviously ready before Dr. Allan passed away, a most remarkable coincidence with Cheeseman's 1925 edition which was under similar circumstances edited by Oliver. It is not an improved and up to date third edition of Cheeseman's Manual, but an entirely new Flora, both in keys and descriptions. The number of species increased from 1184 of Cheeseman to 1273 (Dicotyledons only). Although several species were reduced, new revisions in the past decades added many species specially in some large genera, e. g. *Carmichaelia*, *Dracophyllum*, *Aciphylla*, *Epilobium*, etc. Also in this work many new transfers and combinations are made and there is a special section containing latin descriptions of new taxa, by Dr. Allan and his collaborators Mr M. B. Ashwin, Miss J. A. Hay, and Miss L. B. Moore. Among them are three new genera. Comparing the major sections of this work with that of Cheeseman it appears that the History of botanical discovery is replaced by a chronological bibliography of major works for the New Zealand flora 1769—1958. The list of Maori names, synopsis of classes and orders, glossary of technical terms, and full index remained. New sections are a glossary of author's names, the list of new taxa, a list of abbreviations, a very succinct ecological-geographical sketch of the New Zealand botanical region, and supplementary notes (by Miss Moore) containing corrections and omissions and supplementary additions including also literature of 1959. Furthermore most valuable new assets are the general identification keys to genera and families. Cheeseman's appendix list of naturalized plants has been omitted but will probably follow in the 2nd volume on the Monocotyledons. The nomenclature in the work is brought up to date, in all ranks, and the impression is that extremely great care is given to its composition. Ref. is of course incapable to judge the floristic merits as the proof of the pudding is in the eating and the pudding is too far away from him, but he trusts that the very large knowledge, and unequalled experience of the late Dr. Allan and sound work of other New Zealand botanists has led to a supreme effort for a proper evaluation of the native flora of New Zealand. A major, and almost unique feature in the way of floras is the insertion of a very large amount of commentaries, suggestions, remarks, and criticisms on both species and genera, relating to variability, polymorphism, hybridization, discrimination of genera and species, heteroblasty, growth forms, etc. which seem unusually instructive and give great merit through the large amount of critical observation stuffed in these commentaries. The figures, accompanying mostly large or critical genera, are clear and well executed.



As is usual with local Floras of far-flung areas, some literature has obviously escaped attention. A few examples are Danser's work on *Loranthaceae-Loranthoideae*, reference to which should replace that to Van Tieghem's obsolete work, Ding Hou's revision of *Gaimardia*, that of myself on *Nothofagus*, and Schlittler's on *Liliaceae*. The contraction "Handbk" for Handbook is rather peculiar.

The book is excellently bound and has been well printed on very thin paper, about that used in Encyclopedia Britannica, apparently facilitating its easy transport during field work. Although of excellent quality this thin paper requires thumbing skill in consulting the book. It would have been charming if a biography of Dr. Allan could have been added; I hope this will be inserted in the 2nd volume.

C. G. G. J. VAN STEENIS.

**FRANK KINGDON-WARD, Pilgrimage for Plants** — Harrap & Co. Ltd, London, Toronto, Wellington, Sydney, 1960 — 191 pp. including subject index, and many photographs; — bound in cloth. Price 18/—.

With the possible exception of the Japanese, no people seems to have developed so high an horticultural standard as the British. Nowhere is there so much devotion to the cultivation of flowers and the fostering of public and private gardens. In the many English books on gardening and horticulture, the proverbial English understatement seem to surrender completely to a disarming sentimentalism, and the enthusiasm for the possibilities of adding novelties to the assortment sometimes even surpasses that for much urgent realistic needs.

Kingdon-Ward and his wife — who edited this last book after her husband's death — are typically British in these respects. Ward — Kingdon being his mother's name — devoted practically all of his adult life to plant hunting, and his own statement "of no fixed abode" is typical of his errant life. For a working area he chose the long and lofty mountain ranges of the Himalayas, Southern China, Burma, and Assam which abound in deep and steep gullies as well as in countless species of the most worthy herbaceous and woody representatives of the holarctic flora. The pilgrimage for them, in many cases shared by Mrs. Kingdon-Ward, has been recorded in charming "short-stories", each devoted to a major group: the *Magnolias*, *Nepenthes*, the Blue Poppies (*Meconopsis*), *Prunus* and *Primula*, *Rhododendrons*, *Lilies*, *Gentians*, and *Orchids*, etc.; most of them enlivened by a very readable historical, horticultural, and anecdotal fringe, the last chapter being devoted to "Geography and Living Standards in South-east Asia". The well-known authority on cultivated plants, Dr. W. T. Stearn, of the British Museum (Natural History), added a short biography, listing all of Ward's travels (24 between 1909 and 1957) with a yield of over 23,000 numbers. Stearn also added a bibliography of Ward's numerous publications of which no less than 23 are books. There are two line illustrations in the text, some area maps on the inside covers and a great many photographs in black and white (including a portrait of the author); most of these are of a very good quality and depicting remarkable plants or scenery. It is to be regretted that no colour plates could be added (save that on the dust cover, whose identity I failed to detect), but it is understandable that this would have considerably raised the price which is very reasonable for a book of this standard and quality.

H. J. LAM.

**KNUT FAEGRI, Coast Plants, in Maps of Distribution of Norwegian Vascular Plants**, edited by K. Faegri, O. Gjaerevoll, Joh. Lid & R. Nordhagen, vol. 1 — Oslo University Press, Oslo 1960 — 134 pp., 54 plates, bound in cloth. Price N. Cr. 75.—.

The first volume of this atlas contains maps of distribution in Norway of 156 species of coast plants. Coast plants here means terrestrial plants, which in Norway are restricted in their distribution to coastal districts. Littoral species are not included; their distribution will be dealt with in a future volume of the series.

In an introduction Prof. Nordhagen discusses the history of botanical inventory



work done in Norway. The data of the present atlas are based on herbarium material in Norwegian as well as in Swedish collections, on printed records, and manuscript ones. The working-method is amply discussed. The authors have tried to make the maps as complete and as accurate as possible, leaving out of consideration taxonomically doubtful taxa until future revision will be done.

Detailed data on Norwegian topography, geology, climate and on the ecology of the species dealt with, precede the maps.

Important information is given as to already existing maps of distribution (Norwegian as well as general ones). Notes on the first record of each species for Norway, a discussion of the Norwegian distribution and of altitude limits, a critical survey of excluded or doubtful stations and details about the habitat accompany each map.

This Atlas will be welcome not only to all botanists working on the Scandinavian flora, but also to many others who are engaged in the distribution of European vascular plants.

S. J. VAN OOSTSTROOM.

**F. J. W. BADER, Die Verbreitung borealer und subantarktischer Holzgewächse in den Gebirgen des Tropengürtels. Eine arealgeographische Studie in dreidimensionaler Sicht.** Nova Acta Leopoldina N. F. 23 (No 148): 1—544, 95 Tabellen, 15 Karten, 16 Profile. 8°. 1961. Verlag J. A. Barth, Leipzig. Paper cover DM. 33.—.

In this voluminous work the author has tried first to give in detail the horizontal distribution of the ligneous, boreal (holarctic) and subantarctic genera which are also tropical-montane, second, to describe and discuss their altitudinal behaviour at different latitudes and their association with plant communities.

Besides, the study is chorological and contains of course a distinct element of genetic plant geography.

The data have largely been derived from literature, to which occasionally private information from specialists has been added. The extensive bibliography covers c. 1600 titles, large volumes as well as small papers.

On what basis the genera have been selected is not stated and is not clear, as among the distinctly northern genera I find in superficial checking the following unmentioned: *Illicium*, *Skimmia*, and *Deutzia*, and among subantarctic ones: *Aristotelia*, *Hebe*, and *Kelleria*. The author informed Ref. that he had intentionally omitted *Erica*.

The first part is taxonomically arranged (pp. 23—330) and contains the factual base of the work; 65 genera have been found eligible, belonging to Gymnosperms and 25 families of Angiosperms. Most of the latter are represented by one genus only, the Gymnosperms have 17 genera, *Ericaceae* 8, *Fagaceae*, *Betulaceae* and *Rosaceae* each 4. Of 37 genera distribution maps have been given on 15 maps which are unfortunately on a very small scale and too crowded.

Under each genus there is a discussion of its subdivisions, an enumeration of all species with their altitudes in various places. The largest genera are *Rhododendron* c. 400 spp., *Quercus* 400, *Lithocarpus* 350, *Vaccinium* 350, *Weinmannia* 200, *Gaultheria* c. 160, *Prunus* c. 100, further *Evonymus* and *Rhamnus*. The author points out that species centres do not always reflect the origin of the genus, but he fails to point out that concentrations of infrageneric centra will carry weight in this respect. He finds two main origins rooting in the northern and southern hemispheres respectively; among the total of 65 they stand in a ratio 2:1. No genus has only reached the tropics in Africa. Further, among the northern hemisphere genera only three are not circum-arctic, but among the 19 southern hemisphere genera there are 7 not circum-southpolar. This is of course easily explained by the much larger amount of the land on the northern hemisphere.

This first part is concluded by a survey of the distributional types which are 6 in number, viz: neotropical, neotropical-african, neotropical-Pacific, pantropical, African-Pacific, and Pacific montane.

In the second part (pp. 381—461) the altitudinal zonation is elaborately discussed for each genus, with its relation to plant communities, within these 6 types. For the large genera the altitudinal data are arranged in tabulated form. In the profiles the altitudinal range of the genera is delineated at various latitudes to give a picture of the spatial relations of the ranges.

No final conclusions or theses finish the work, and the two pages general remarks contain no new plant-geographical aspects. There is unfortunately no index.

As can be expected in such a large work details have sometimes been overlooked, e.g. *Nyssa hollrungii*, the only New Guinea record of the genus is *Alangium* (cf. Wasscher), and some papers have been omitted, for example: Diels, Ueber die Ausstrahlungen des holarktischen Florenreiches an seinem Südrande (Abh. Preuss. Ak. Wiss. 1942). But on the whole the treatise seems to be fairly complete.

Summarizing, in this compilation the author has brought together a large amount of raw material unearthed from literature, which may be useful for consultation.

C. G. G. J. VAN STEENIS.

NYHOLM, E., *Illustrated Moss Flora of Fennoscandia*. II. Musci, fasc. 3, 189—287, 1958; fasc. 4, 287—408, 1960.

These two fascicles are a continuation of the well-known moss flora of Nyholm, of which the first two fascicles have been reviewed in *Blumea*, 8 (2), 1957, p. 533. Fasc. 3 and 4 deal with the *Eubryales*, *Schistostegales* and part of the *Hypnobryales* (mainly those with isodiametric leaf cells). The only groups of Musci to be treated in the coming fascicles now are: *Hypnobryales* p.p. (viz *Amblystegiaceae*, *Brachytheciaceae* and the suborder *Hyppineae*), *Sphagnales*, *Andraeales*, *Buxbaumiales*, and *Polytrichales*. It is to be hoped that a general index as well as a key for all Musci, leading directly towards the genera, be given at the end of the book.

All fascicles published so far are quite uniform in both outline and set-up. A few additional remarks will therefore suffice. Again the reader is impressed by the excellent, original descriptions of the species, although one would wish to have the diagnostic characters italicized. This flora is partly based on original observations and uses original characters, also in the keys, for instance the difference in number of papillae on the lamina cells between *Stroemia obtusifolia* and *S. gymnostoma*. Number and arrangement of papillae on the cells, often neglected characters, are, by the way, used throughout the book.

Several taxa, which are merely credited with varietal rank in other floras, e.g. *Orthotrichum fastigiatum* and *Neckera oligocarpa*, are rightly treated as species here. Some opinions are very original, for instance that the well-known, widespread species *Orthotrichum affine* is probably a hybrid between *O. fastigiatum* and *O. speciosum*.

Nomenclature seems to be mostly correct and up-to-date. In taxonomic respect it mainly follows Brotherus, which means that the genus concept is narrow. In some cases, e.g. *Barbula*, a remarkably wide concept is adopted, however.

It is a great pity that the illustrations are not too good, especially those showing the habit of the plant. Drawings of leaf cells are not very clear either. The figure of *Antitrichia curtipendula* does not show the recurved teeth at leaf apex, so typical of that species.

The keys to the genera and in some cases even those to the species often make use of unnecessarily difficult or uncontrollable characters, f.i. sporophyte characters. The genus *Zygodon* can only be identified with fruits, although it hardly ever fruits in these regions. It is rather embarrassing and quite unnecessary for a practical key to separate the genera of *Mniaceae* on the sole basis of peristome teeth and capsule stomata. The same characters have to be examined to identify striking species as *Orthotrichum diaphanum* and *O. lyelli*, which can easily be told apart without them. The student will therefore often be obliged to follow many different lines in the keys, although the book is said to have been written because in other floras "workers... have often been obliged to devote much time and work to even the simplest moss identification"!

In addition the keys contain some errors, e.g. in the genus *Mnium*. *Mnium affine* certainly does not always possess acute teeth down to the base of the leaf. The teeth of the leaf margin in *Mnium serratum* are not less sharp than in *M. hornum*. Why has *Mnium stellare* (leaf border not thickened, with single row of teeth) been included in the group of species with a strongly thickened border and biseriate teeth? It is, for that matter, without making a transversal leaf section, difficult to decide whether



the leaf border is one or two cells thick. When identifying *Tortula laevipila*, one has to choose "large species" growing "on living trees", whereas this moss may be quite small and may grow on calcareous walls and stone (roofs).

The descriptions of the habitats are decidedly better than in Dixon and often even than in Moenkemeyer. Yet, one would wish them to be more detailed. In the genera *Ulota* and *Orthotrichum* for instance it is important to know whether the species grow in woods or on wayside trees, on broad-leaved trees with rich, neutral bark or with poor, acid bark.

J. J. BARKMAN.